MANUFACTURER'S RECORD

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SCIENCE AND INDUSTRY

New Year's Greetings

With the flower of our youth actively engaged in conquering brutal enemies, it does not seem right to say "Happy New Year."

With the finest brains and brawn of the nation unselfishly being devoted to backing up our winning arms, it is impossible to wish any individual a "Prosperous New Year."

But it is our wish that the New Year bring to every American the moral courage and physical vigor to think and act as a MAN.

A MAN when he shaves in the morning can look at his reflection in the mirror and can say to himself "I did a day's work yesterday and I am good for another one today." That is our wish for you.

SCHWARZE-FARADAY

Uni-Pact Signals

are instantly interchangeable

PROMOTE efficiency, simplify your plant signal problems—and *save* at the same time—with the ultra-modern Schwarze-Faraday UNI-PACT feature! One outlet, with a single adapter-plate allows you to plug in a Bell, Horn, or Kodaire to meet changing plant conditions without loss of time, and with no added expense.

AUDIBLE SIGNALS OF ALL TYPES—The Schwarze-Faraday complete line provides for every particular plant need that may arise. Included are Horns, Bells, Buzzers, Air-Trumpets, Kodaires and Chimes—each a triumph in modern design and dependability.

ASK OUR ENGINEERS—Our factory-trained engineering staff will gladly aid you in designing the most efficient installation to meet your individual requirements.

SEND FOR *FREE* CATALOG—Completely indexed, illustrated, and exceptionally easy to use, our new catalog will provide you with an invaluable reference guide for all your signal problems.

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They all fit the same adapter-plate

The Dead-Front Adapter-Plate is a part of each UNI-PACT signal assembly. It is identical for all sizes and fits each one without change of electrical connections.

***UNI-PACT* SAVES TIME, MAINTENANCE AND INSTALLATION COSTS**

SCHWARZE ELECTRIC COMPANY

ADRIAN, MICHIGAN

MANUFACTURERS RECORD

ESTABLISHED 1882

A Publication for Executives

Volume 113 JANUARY, 1944 Number 1

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1944
S 670 v.113

MANUFACTURERS RECORD PUBLISHING CO.

Publishers of MANUFACTURERS RECORD, CONSTRUCTION (daily), CONSTRUCTION (monthly) and BLUE BOOK OF SOUTHERN PROGRESS.

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Chicago (4)—28 East Jackson Blvd., Room 712. Phone: Harrison 5867.
Atlanta—1709 N. Emory Road, N.E. Phone: Dearborn 8052.

Subscription Rates: One Year $3.00. Two Years $5.00.
Single Copies 25c, back numbers over 3 months old 50c.

Entered as second class matter at the postoffice, Baltimore, Md., U.S.A., under act of March 3, 1879. Volume 113, Number 1. Monthly.

N.A.

The Blue Book

SOUTHERN progress of the future will have as its basis not alone the unequalled natural resources of the South, but the practical, money spending recognition that has been accorded the advantages of this section for manufacturing in many lines.

The South has put forth full effort for war and is geared for a truly great program in the days of peace yet to come.

Facts bearing upon war days and including the record growth over previous years are set forth in the BLUE BOOK OF SOUTHERN PROGRESS for 1943 now going to press.

It will be a bigger and better book in every way. It will print a compelling story of industrial creation abundantly illustrated and backed by census figures on the growth that has taken place.

Kept always by recipients for constant reference, the BLUE BOOK OF SOUTHERN PROGRESS is recognized everywhere as the outstanding authority on the South that today is universally admitted to be the most promising horizon in the United States for investment and enterprise.

There will be found in this volume amazing facts of the great part the South is taking in the commerce of the country.

Of the vital resources of America, the South produces from 50 to 100 per cent in many lines. Don't overlook the fact that an area once largely devoted to agriculture now has a manufacturing volume in dollar value three times its agricultural production in dollar value.

THE BLUE BOOK OF SOUTHERN PROGRESS is compiled and published by *The Manufacturers Record*, Baltimore, Maryland. The 1943 Edition will be ready for distribution about February 1.

DEC 20 1945

"Oh Dear–12 More Stops to Make!"

President Smithers is handling deliveries himself, today. And, as you see, he's away behind schedule.

Joe, his delivery man, would finish in half the time. For Joe has the job down to a series of orderly, organized operations. Here, as everywhere in business or industry, routinized work is *swift* work.

One of the biggest benefits that Uarco Record Forms bring business and industry is to make sure that every operation is performed in the swiftest, most efficient way.

In shipping departments—order departments—accounting departments—wherever forms are used —Uarco Records keep the work flowing with speed, accuracy and economy. For Uarco forms *routinize* the job . . . by properly *recordizing* it.

Uarco's years of experience in producing autographic (hand written) and typewritten record forms may help you solve a complicated management problem . . . achieve better customer relations . . . prevent mistakes . . . perform more work with fewer employees. It costs nothing to ask a Uarco representative about it.

UNITED AUTOGRAPHIC REGISTER COMPANY
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"What Enriches the South Enriches the Nation"

NEW YEAR

IN the past we, in America, have become accustomed to seeing pictures that portray the coming of the new year as a baby and the passing of the old year into history as a decrepit old man with a scythe over his shoulder. This new year of 1944 should be sketched in a different pattern.

1944 is not a baby. Like a fabled character, he springs into being in the full bloom of a vigorous and courageous manhood.

1943, in spite of the fact that he is retiring to pages of history, is retiring as a man who has done a good job and deserves a well earned rest. He is not an old man. He is turning over his job to vigorous youth.

An artist could draw a New Year's picture that might illustrate the following thoughts:

1943 is welcomed on the players' bench by the coach of the football team. He is welcomed because he did a swell job against odds that appeared to be insurmountable. He really played the game.

As he looks along the bench he sees the historic representatives of other years. He sees 1930, 1931 and 1932, crushed with the sorrows of their own memories, sitting with their heads downcast in their hands.

He also sees 1933 and 1934. He sees them assuring each other that if the changes they had made in the game had not been declared illegal they would have been unbeatable.

He sees 1935, 1936, and 1937 saying to each other, "Well, we did fairly well, we broke a bit better than even and we drew good crowds."

Then he looks at 1938, 1939 and 1940. Their faces are complacent. They express satisfaction with what they have done,—a "we can coast along on past record" look.

But then he looks at 1941. This fellow shows that he ran into competition for which he was unprepared. He is still suffering from a kick in the groin but his chin is up and his eyes are blazing.

And 1942 is sitting right alongside. He is a determined looking fellow. He took the bumps, and by looking at him you could tell that he took them and got up swearing and ready to be knocked down again.

1943 feels pretty complacent as he looks down the line of his predecessors but just as his chest begins to swell with self-pride, 1944 runs onto the field at the head of his team. 1943's chest deflates, his eyes expand as he says to himself, "My gosh, what a fellow!" Then his chest expands again as he realizes that this man is his successor and that he helped to make the team.

He turns to the coach and expresses his admiration. He knows that 1944 has what it takes. The material is there. The material must be made into the unit of a team. He knows that it is up to the coach.

Forgotten Man

It is impossible to write too much about the Forgotten Man of the present era. Very often this Forgotten Man is a woman. He or she is the person who faces rising prices and taxes with decreasing income from safe investments or a static income from fixed salary.

This Forgotten Man who was taught that saving was a virtue, now sees his savings dissipated by the extravagance of political manipulators and jeopardized by the selfish interests which in turn manipulate them.

With a few praiseworthy exceptions, the men who form our National Government, from the President on down, are more interested in maintaining either their love of power or their place at the public trough than they are in protecting the rights and welfare of the great mass of Americans who support their country so loyally. They are influenced by the thought of votes—mass votes. They are just beginning to see that the American vote is the mass vote and that it will be cast for the courageous man who will defy pressure politics.

It is the right of every honest publication and of every patriotic man, to object to a "Win the War" slogan being attached to the coat tails of any national party. No political party can win this war. It can be won by the South, the North, the Middle West and the West working and fighting together as a nation under efficient and unselfish leadership. It can be won in no other way. The Army and Navy, the Marine Corps and the Coast Guard have proved beyond the shadow of a doubt that slogans will not win wars but that unified leadership can do the job. Their Forgotten Man was left on the Philippines.

Political skulduggery at a time like this is fatal. Our national unity is being temporarily disrupted and the little clique that is bucking the onrushing tide of popular opinion will be swept out to sea. They will soon be the Forgotten Men.

Because of a sincere belief in constitutional government, we hope that citizens will have an opportunity to vote FOR the candidates of one of the two great parties, candidates who have the future welfare of our land in their minds and hearts, their own futures in front of them and a truthful past behind them.

"Win the War" by all means. But one man or small group of men can not win it. Propaganda to that effect is a lie and should be labeled as such.

Under the Constitution of the United States there is no such legal entity as a Forgotten Man. Under the same Constitution, such a political entity can be made into a political nonentity at any election in which he runs for office.

Forgotten Man is a dangerous term for politicians to use.

Words or Figures?

Without comment, for comment is unnecessary, the following is included in the editorial columns. The words were supplied by our present president. The deeds are omitted because they would take pages to merely enumerate. The figures speak for themselves.

"I know something of taxes. For three long years I have been going up and down this country preaching that Government—Federal and State and local—costs too much. I shall not stop that preaching."

FRANKLIN D. ROOSEVELT, Chicago, July 1932.

"I accuse the present (Hoover) administration of being the greatest spending administration . . . in all our history. One which has piled Bureau on Bureau, Commission on Commission. Bureaus and Bureaucrats have been retained at the expense of the taxpayers."

FRANKLIN D. ROOSEVELT, Sioux City, September 1932.

"The people in America demand a reduction of Federal expenditure. It can be accomplished by reducing the expenditures of existing departments; by abolishing many useless Commissions, Bureaus and functions, and by consolidating many activities of Government."

FRANKLIN D. ROOSEVELT, Brooklyn, November 1932.

"But remember well, that attitude—the way we DO things—is nearly always the measure of our sincerity."

FRANKLIN D. ROOSEVELT, Butte, Montana, September 1932.

PUBLIC DEBT OF THE UNITED STATES
(On basis of daily Treasury Statements)

June 30	*Gross Debt* Dollars	*June 30*	*Gross Debt* Dollars
1919	25,482,034,419	1931	16,801,485,143
1920	24,297,918,412	1932	19,487,009,766
1921	23,976,250,608	1933	22,538,672,164
1922	22,964,079,190	1934	27,053,141,414
1923	22,349,687,755	1935	28,700,892,624
1924	21,251,120,427	1936	33,778,543,494
1925	20,516,272,174	1937	36,424,613,732
1926	19,643,183,079	1938	37,164,740,315
1927	18,510,174,266	1939	40,439,532,411
1928	17,604,290,563	1940	42,967,531,037
1929	16,931,197,748	1941	48,961,443,536
1930	16,185,308,299		

Please note that none of the above figures include those for the years of World War No. 1 nor No. 2. The United States entered World War No. 2 on Dec. 7, 1941. From the complexity of conflicting figures made public for 1942 and 1943 even an Einstein would be at loss to know how to figure the present debt.

Emergencies — Are They Permanent?

Ever since 1933 the New Deal has managed to keep the country in a State of Emergency.

Each emergency has followed on the heels of its predecessor. When the debris is cleared away, truthful and unprejudiced historians will be able to tell coming generations how many of these emergencies were caused "because we planned it that way" and how many resulted from the stupid and inept bungling of the "planners."

There is a real emergency now. It was not created in Washington. It was created in Tokyo and Berlin. This real emergency of war hanging over the heads of all of us was the deciding factor that determined the election in the fall of 1940. Many people who otherwise would not have voted for the "highlights" of the New Deal did so because they approved the foreign policy that they hoped it was following. They felt that they would weaken the position of Great Britain and China as well as of the United States if they did otherwise. In short they made up their minds and cast their votes influenced by two different perspectives, one foreign relations, the other domestic affairs.

Certainly there were some millions who cast their votes in the last presidential election who did so because they followed the instructions of leaders who appealed to the selfishness that unfortunately exists in most human beings, but it was the votes of patriotic citizens who placed the safety of their country above their knowledge of domestic bungling that made a third term possible.

Citizens of America do not want, nor will they tolerate, a self perpetuating political hierarchy whether it be imposed upon them by force or by the subtle method of government paternalism and largess. Americans have been taught to believe and still do believe that the Constitution protects their rights and liberties and regulates their duties toward their fellow men.

But how can the Constitution protect the people when the chief executive, in spite of his oath of office, urges the passage of a law by Congress when he admits its possible unconstitutionality? And Congress passes this law and the chief executive signs it. (The so-called Guffey Coal Act.)

How can the Constitution protect the people when its interpretation by the Supreme Court is in the hands of a group made up for the most part of ex-politicians and offcast politicians (with one notable exception) and is probably guided by the shrewd and alert mind of a man who was born and received his primary education in Vienna, Austria?

How can the Constitution protect the people when they are daily subjected to ever changing executive edicts, regulations and "ukases" that are enforced by the same agencies, commissions or bureaus that issue them and when compliance with them is judged by the same executive authorities?

The domestic series of emergencies is a thing of the past but a real domestic emergency undoubtedly will occur with the end of the war. To meet this coming emergency we will need a combination of the best brains and the most unselfish judgment that this country can produce. It is not fair to expect one indispensable man surrounded by termites gnawing at the framework of the Constitution to face this coming emergency. It is not fair to him, nor is it fair to the men, women and children who are America.

The Nation's No. 1 Problem

1938

In a message to the Conference on Economic Conditions in the South, July 4, 1938, President Franklin D. Roosevelt said:

" . . . My intimate interest in all that concerns the South is, I believe, known to all of you, but this interest is far more than a sentimental attachment born of a considerable residence in your section and of close personal friendship with so many of your people. It proceeds even more from my feeling of responsibility toward the whole nation. It is my conviction that the South presents right now the nation's No. 1 ECONOMIC problem—the nation's problem, not merely the South's. For we have an ECONOMIC unbalance in the nation as a whole, due to this very condition of the South.

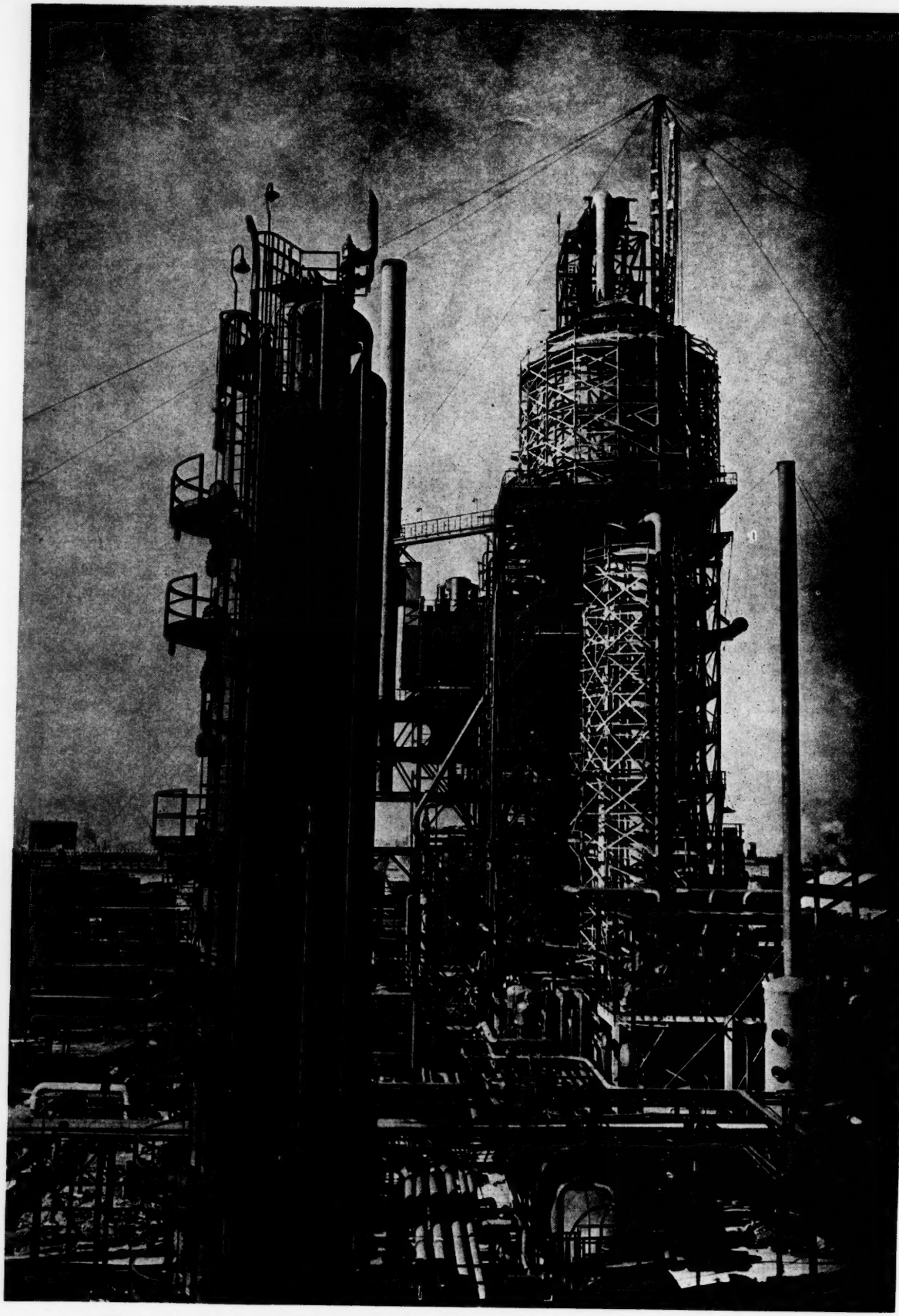
"It is an unbalance that can and must be righted, for the sake of the South and of the nation. . . . "

1944

In a message to the citizens of the Southern States, if made in January, 1944, President Franklin D. Roosevelt might now say:

" . . . My intimate interest in all that concerns the South is, I believe, known to all of you, but this interest is far more than a sentimental attachment born of a considerable residence in your section and of close personal friendship with so many of your people. It proceeds even more from my feeling of responsibility toward the whole nation. It is my conviction that the South presents right now the nation's No. 1 POLITICAL problem—the nation's problem, not merely the South's. For we have a POLITICAL unbalance in the nation as a whole, due to this very condition of the South.

"It is an unbalance that can and must be righted, for the sake of the South and of the nation. . . . "



New $6,000,000 fluid catalyst cracking plant dedicated at Baltimore by the Standard Oil Company. Article on page 37.

Economic Center of Gravity Shifts South and West

THE center of gravity of American economic life has shifted markedly South and West during the war.

The wartime program of new capital investment has tended to bring about a geographic diffusion of the American industrial plant. The relative importance of the less-well-developed regions is being markedly increased and the relative importance of the highly-industrialized Atlantic Seaboard states—particularly the Northeast—is being diminished.

Such is the finding of K. C. Stokes, Department of Commerce economist, in a detailed study just published under the title, "Regional Shifts in Population, Production, and Markets." Indications of this trend are found, he says, in "the dramatic rise in the relative importance of the Pacific, the South Atlantic, and the East South Central regions, and by the relative decline of the populous Middle Atlantic region."

The studies go back far enough to show that the wartime geographic shifts on the whole represent acceleration of existing, long-term trends. They are of particular interest in relation to the probable position of the various regions in the post-war period.

Figures on the South In Wartime

PERCENTAGE OF INCREASE 1939-42

Employment Other Than Agriculture

THE NATION .....up 25.0%
THE ATLANTIC SOUTH ..up 30.8 %
THE MIDDLE SOUTH ....up 30.6 %
THE WESTERN SOUTH...up 25.4%

Income of Individuals

THE NATION .....up 61.5 %
THE ATLANTIC SOUTH ..up 73.9 %
THE MIDDLE SOUTH ....up 83.1 %
THE WESTERN SOUTH ..up 78.1 %

Bank Debits

THE NATION .....up 56.8 %
THE ATLANTIC SOUTH ..up 66.7 %
THE MIDDLE SOUTH ....up 71.5 %
THE WESTERN SOUTH ..up 55.4 %

Electricity Consumed

THE NATION .....up 45.4%
THE ATLANTIC SOUTH..up 57.3 %
THE MIDDLE SOUTH ...up 101.5 %
THE WESTERN SOUTH ..up 39.6%

POPULATION

"The net shift in civilian population from states which have experienced a relative loss to those which have enjoyed a relative gain represents about 2 per cent of the total population or about 2,500,000 persons," the report states.

"Recent data on the redistribution of the civilian population have been compiled by the Bureau of the Census. These estimates are based primarily upon registrations for war ration books one and two. According to these figures, the total number of civilians in the United States declined between April 1, 1940 and March 1, 1943 by 3,100,000, or 2.4 per cent. This decline is accounted for by the fact that the number of persons drawn into the armed forces during this period was greater than the natural population increase. All regions except the Pacific and South Atlantic shared in the decline."

The South Atlantic group of states showed a 1 per cent increase in civilian population and the Pacific Coast states one of 7.3 per cent. All other sections of the country showed a decrease the rest of the South declining 4.8 per cent in the eastern part, 3.2 per cent in the western.

Migration to the cities has been so heavy as to increase their civilian population, counter to the decline for the country as a whole. The 137 metropolitan areas grew by 1,700,000 in the three years ending in March, 1943, an increase of 2.5 per cent. Greatest rate of growth was shown by the Norfolk-Portsmouth-Newport News area in Virginia whose population jumped 42.2 per cent. San Diego was second, San Antonio third and Washington fourth.

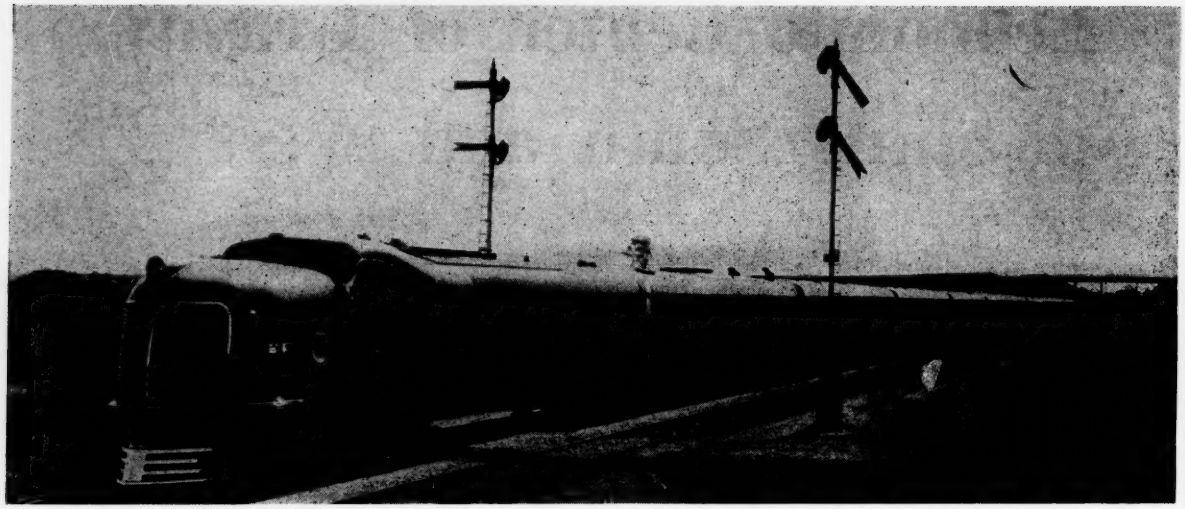
Whether or not recent population shifts to industrial centers will be offset by a reverse movement after the war is difficult to predict. A survey made by the National Association of Real Estate Boards indicates that about 60 per cent of the war workers intend to go back to their former homes and occupations.

EMPLOYMENT

An outstanding fact on Southern employment in the years from 1939 through 1942 was that the general decline in agricultural labor and increase in non-agricultural work was considerably more marked in the South than in the rest of the nation.

The country as a whole ended the period with 3.2 per cent fewer people working on farms. Agricultural labor in the seaboard states of the South (plus West Virginia) dropped 5.5 per cent; in the central block of states from Kentucky to the Gulf, 6.8, and in the western part of the South 4.3. All three of these areas showed sharper percentage gains in non-agricultural employment than the country as a whole, the figures being 30.8, 30.6 and 25.4 respectively, against a national average of 25.0. Gains in strictly manufacturing employment were below the

(Continued on page 72)



The streamlined City of Denver is one of a dozen aluminum trains built before the war.

Aluminum in the Post-War World

POST-war use of aluminum will be influenced by price, abundance and the number of workers skilled in its manufacture, according to a survey by the Aluminum Company of America.

Price is regarded as most important, with recent reductions placing the featherweight metal in a favorable position to compete in new fields. Large quantities of aluminum are expected to be available to satisfy any civilian requirements. Thousands of workers now employed in war industries are expected to turn their newly acquired skill in fabricating, casting, forming and assembling the implements of war into peacetime production.

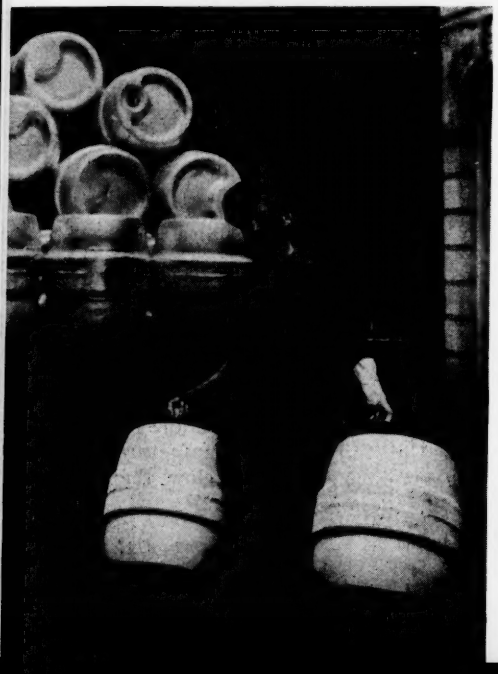
Where many of these aluminum workers will come from can be seen in the fact that 90 per cent of the aluminum produced today is used by the aviation industry.

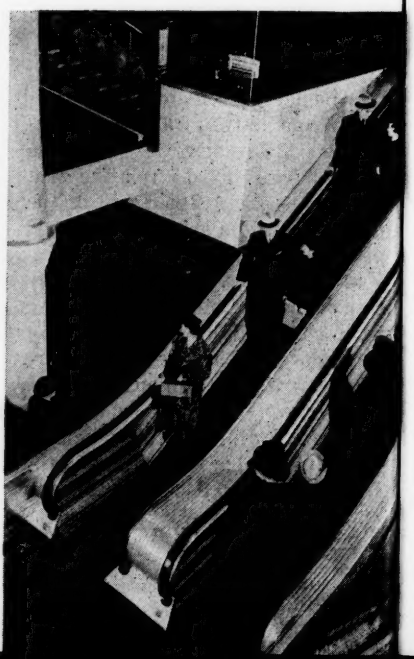
The United States is now able to produce aluminum at the rate of more than 2,100,000,000 pounds a year, or six and one-half times the output of 1939. Plants for producing these huge quantities have been established by expansion by private industry and by construction of permanent and emergency works by Federal agencies.

Privately financed extensions led the procession when late in 1938 as war clouds gathered over Europe the Aluminum Company of America began a program of additions which involved a capital expenditure approximating $300,000,000. This step is recognized as an important factor in the nation's military preparedness. Without such expansion, there might have been serious shortages at the beginning of the war.

Defense Plant Corporation instituted the action which added another 512,000,000 pounds to the nation's capacity to produce aluminum. The third phase in the expansion added 640,000,000 pounds to the annual output by additions to the original plan and construction of works using standby power in metropolitan areas.

Many new uses for the metal must be found and older applications widened, if the tremendous





Pre-war brewers found aluminum barrels like those at left light, non-toxic and durable. Such interior structural uses as shown in the escalator at right were making rapid headway at war's start.

capacity, coupled with additional metal available from Canada under contract with the Metals Reserve Corporation, is to be utilized. Research and development work in this direction is publicized as "imagineering," an activity carried on during the "eighth day of the week" whenever such planning does not interfere with war production.

Many of the developments for war also hold high promise for civilian application. One of these is the new high strength aluminum alloys now employed in aircraft manufacture. Another is the new technique for brazing lightweight aircraft assemblies. The finishes by chemical and electrochemical means are also recognized as important in post-war potentialities.

Use of alloys in lightweight structure design may be extended to all types of design including trains, trucks, automobiles and ships. A dozen all-aluminum streamlined trains had been built up to the war. Every pound of deadweight saved in trucking equipment is seen as a pound added to the payload. Aluminum freight cars may be the next in line. Tests have been made with aluminum hopper cars for coal and sulphur transportation. Aluminum tank cars have been in operation over 15 years.

Aluminum is no stranger to the naval architect. Light in weight and resistant to corrosion, the metal had found many ship-board applications before the war. These included life rafts, davits, bulkheads, fittings and various parts of the superstructure. Wartime use may see as much as a million pounds of aluminum go into construction of a single battleship to permit decrease in deadweight.

Ream after ream of copy has been written about the post-war automobile. Predictions cover everything from a facsimile of the 1942 car to a design based on the most advanced futuristic theory. What most authorities agree on is that the automobile after the war will be much lighter in weight than its pre-hostility forebear, with increased efficiency and lower operating costs.

Powdered coffee sent to the war front is protected by heat-sealed packages of plastic coated aluminum foil.

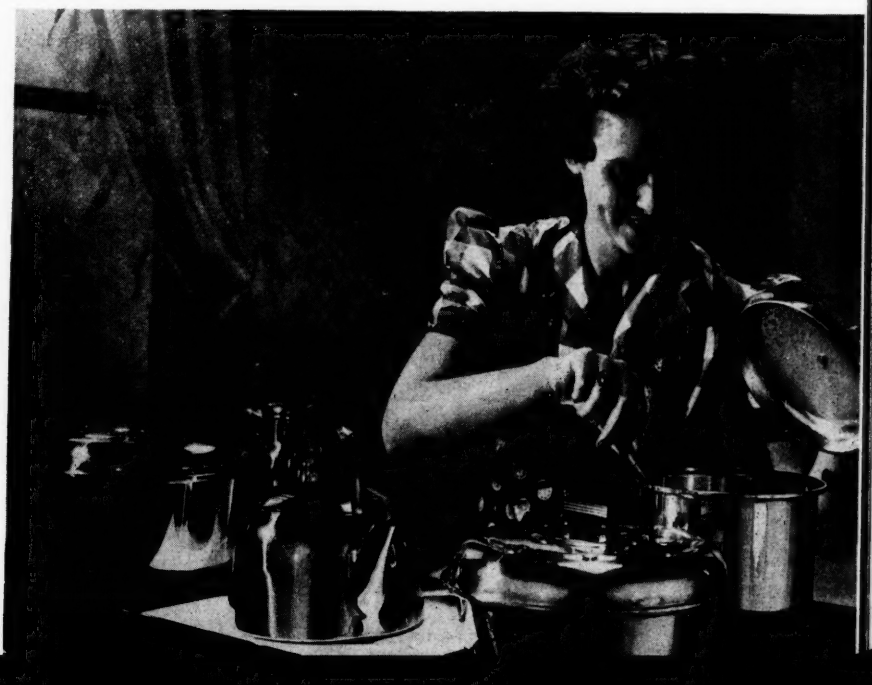
A possible criterion of cars to come may be the airplane. Aluminum comprises about 75 per cent of the modern military plane. In a four-engine bomber, something like 48 per cent of its weight is aluminum sheet.

Engineers propose reduction of automobile weight to about 70 per cent of what was standard in 1942. One-half of this decrease could be obtained by use of aluminum. New cars—when their manufacture is resumed—may have aluminum motors, as cylinders and pistons were already recognized before the war and cylinder heads, engine blocks and oil pans have proved themselves under service conditions.

Plane production also holds a favorable spot on the post-war stage. Predictions are that an entirely new market will develop after hostilities cease. Some experts forecast the helicopter as tomorrow's "flivver" of the air. Other post-war aviation aluminum markets will be in larger and faster cargo and passenger planes.

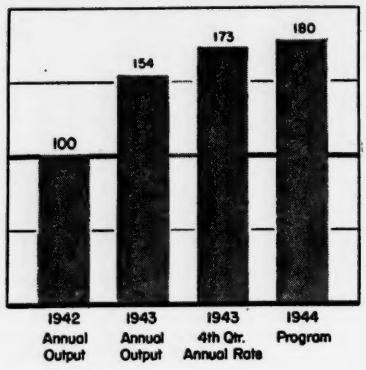
Merchandise containers of aluminum are another prospect. Such containers, say officials of the industry, could be used for combined rail, water and air freight. Use of aluminum in packaging included foil wrappers for

(Continued on page 68)

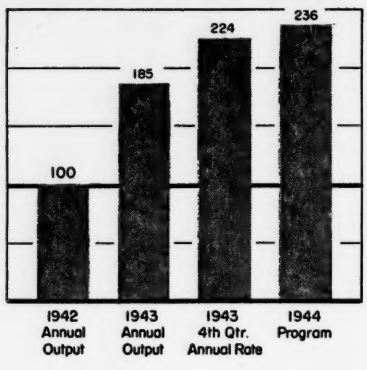


Virtually off the market now, aluminum kitchenware promises a strong post-war comeback.

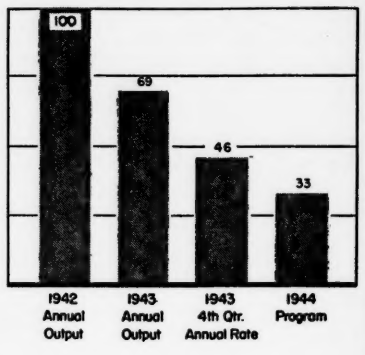
TOTAL WAR PRODUCTION



MUNITIONS PRODUCTION



CONSTRUCTION



Shifting Trends in War Output

Lines change but overall need is undiminished

"The war in Europe seems likely to tax both our capacity for sacrifice and our capacity for industrial production beyond anything we have experienced so far . . . What I have said of the European war can be underlined with respect to the Asiatic war."

With this statement Charles E. Wilson, General Electric's president, who became executive vice chairman of the War Production Board, presented a series of charts to the National Association of Manufacturers at its December War Congress in New York. Six of them are reproduced on this page.

A major point brought out is that no longer is it necessary that *all* war production go steadily up. Navy ship production will drop in 1944 and then level off. Construction will continue to decline as it has since the maximum war plant program of 1942. But aircraft production, to give the outstanding example, will continue to soar in tonnage.

"In 1943 it was relatively easy for people to grasp the war production problem," he said. "In almost every war industry the call was for greater output. But the production job for 1944 will be much harder for the public to understand.

"Next year we shall be saying to those responsible for aircraft production, 'Keep your pressure on; give us more.' At the same time we shall be saying to the ship builders, 'Keep your productive effort at about present levels,' and we shall be saying to the producers of equipment for the ground army, 'Cut down production.'

"We are coming to a period of complex readjustments in production. Facilities, materials and manpower will be released in one segment of the war production program when they are vitally needed in another segment. People must not be allowed to gain the impression that a cutback in a single segment means a curtailment in overall production. It means no such thing . . .

"The essential fact is that the 1944 overall schedules call for performance higher even than our current rate—a performance 80 per cent above our 1942 record.

"I believe that in general, subsequent revisions will not be upward. But I can offer my considered opinion that barring unexpectedly early termination of the war in the European theater, such revisions will not substantially reduce our 1944 production below present levels."

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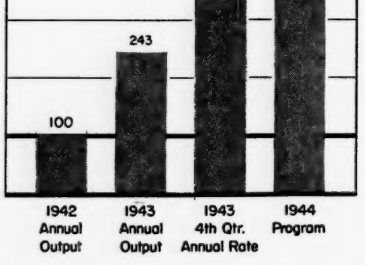

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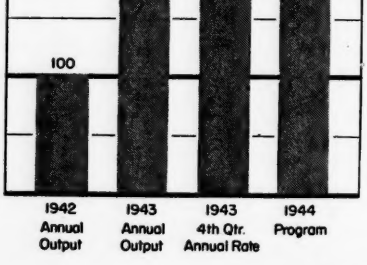
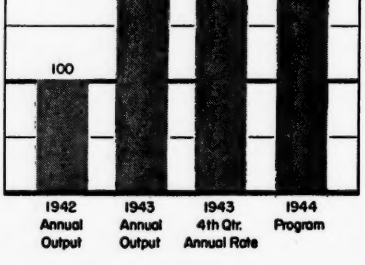


MARITIME COMMISSION



Coal: Needs and Outlook for 1944

Enough labor is not in sight to fill demand

THE United States enters the year 1944 facing a coal supply problem of extreme gravity. It is a problem of inadequate and uncertain production, rapidly diminishing stockpiles, and the increasing demands of the war.

Because we were using coal faster than we could produce it during 1943, the stocks in the bins of industrial users and retail dealers dropped from 86,000,000 tons at the beginning of the year to 60,000,000 tons at the close. From present indications the country will end the first quarter of 1944 with only enough coal mined and above ground to last less than a month. This is a dangerously low reserve level.

The goal set for bituminous production in 1944 is 620,000,000 tons, and it is probable that this figure will be revised upward with the approach of major military operations in Europe. The industry produced considerably less than that in 1943, the most optimistic estimates as the year drew to a close being about 580,000,000 tons. The South normally accounts for slightly less than half the country's bituminous and lignite production.

The prospects for 1944 bituminous production are analyzed by Harold L. Ickes, Solid Fuels Administrator for War, as follows:

"According to the last estimate, there are 415,000 miners employed in the bituminous mines. In 1941 the average production per miner was 5.2 tons per day. Even under the six-day week the maximum number of days per year miners average is 280, after deductions have been made for holidays and normal shutdowns for repairs and replacements.

"If every one of the 415,000 men now employed appeared for work every day the mines could operate in 1944, and dug 5.2 tons of coal, the total production for 1944 could be only 604,240,000 tons."

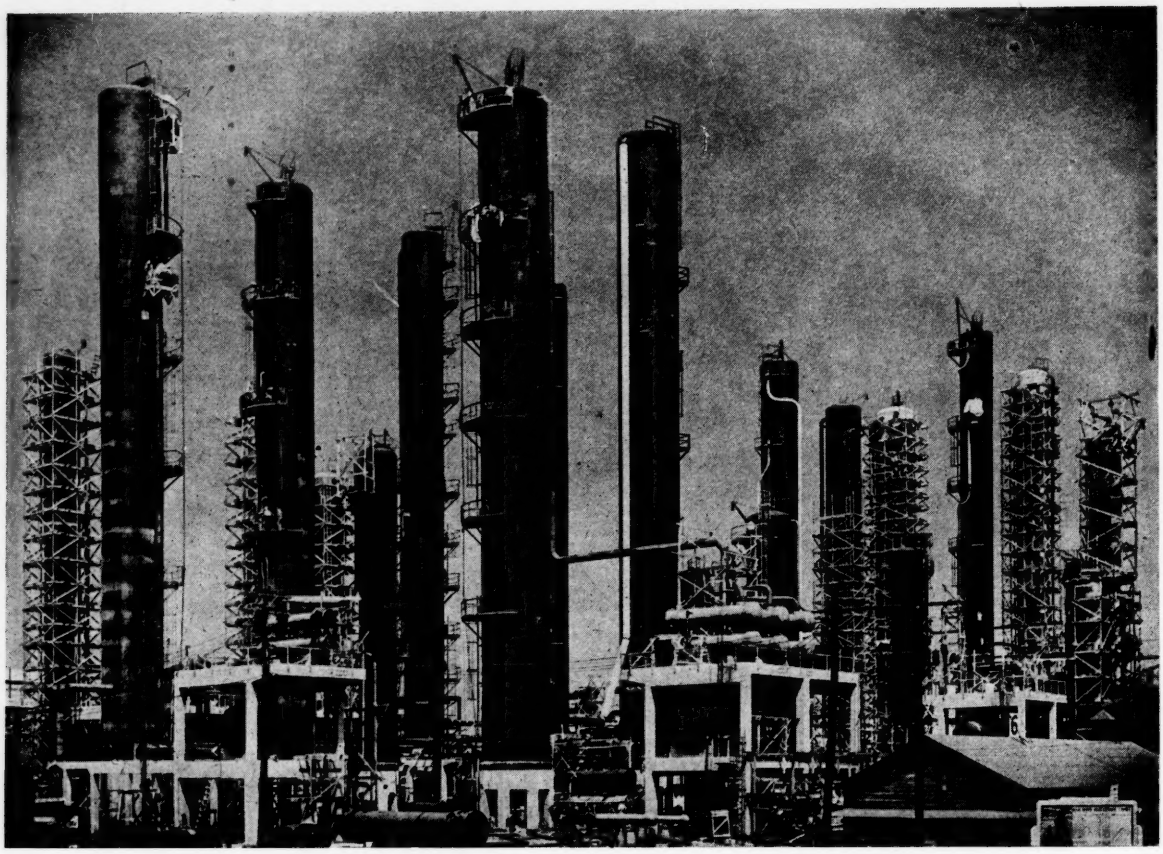
It is wholly unlikely that mine manpower can be sustained at 415,000, inasmuch as the mines are losing workers to the armed services and to other industries at the rate of 2,600 to 2,800 a month and only about half the losses to date have been or can be replaced. Another factor in production is that the average age of miners has increased about eight years since 1940, with the accompanying possibility that the man-day average production has declined. The 604,240,000 optimum estimate would be considerably reduced even by normal work absences, to say nothing of strikes.

Anthracite coal, which cuts a smaller figure in the national picture but is vitally important, is in roughly the same position as bituminous. The government asked for a production of 65,000,000 tons and at year's end it appeared about 61,000,000 had been mined.

Great Britain has experienced a coal pinch considerably worse than that of the United States, and has become accustomed to a policy of "no coal for comfort." The labor shortage has resulted in filling the gaps through the military conscription system, and at present—partly through this means and partly through help from the United States in the form of coal mining machinery—Britain expects to produce more coal for continental operations.

One remedial action taken by the Solid Fuels Administration has been to obtain a higher preference rating for manufacture of coal mining machinery. Breakdown of such machinery is second only to the manpower problem in importance, and in the course of a

(*Continued on page 75*)



These Texas towers will produce one-eighth of the butadiene for America's synthetic rubber.

Where Synthetic Rubber Starts

Five firms make butadiene from Texas oil

By J. C. WATKINS

FIVE major oil companies will celebrate in February the success of their joint industrial efforts at Port Neches, Texas, following the start of full-scale operations at the Neches Butane Products Company 100,000-ton-a-year butadiene plant.

Officials of Atlantic, Gulf, Pure, Socony-Vacuum (Magnolia), and Texas Corporation will take part in festivities commemorating the unveiling of the establishment which they created as a non-profit enterprise designed to supply one-eighth of the entire national requirement of butadiene for the wartime synthetic rubber program.

All five companies have their own refineries in the area and will feed butane to the plant for processing into butadiene.

The Port Neches project had its inception January 12, 1942, little more than a month after Pearl Harbor, when Herbert Henderson, vice president of the Gulf Oil Corporation, went to Washington at the call of the government to discuss the synthetic rubber program. One of the chief bottlenecks of that program was butadiene, principal ingredient of synthetic. Mr. Henderson suggested that a butadiene plant of 100,000 tons capacity be built in the heart of the Texas Gulf Coast oil region, to be supplied with feed stocks by the nearby refineries of five oil companies.

Mr. Henderson telephoned the president of his own company and of the other concerns and explained the situation to them. They not only agreed to supervise construction and operation of the plant without profit but to furnish to the government the services of management, advisory, technical and legal committee members and to pay their expenses.

Organization of the Neches Butane Products Company was the upshot. Each oil company named two representatives as directors, with Mr. Henderson being made chairman of the board and W. H. Hoffman, who was made available by The Texas Company, made president.

In undertaking the project, the oil industry assumed one of the toughest jobs in the war production program. It was called upon not only to produce butadiene in far larger quantities than ever before, but to develop a process which

would yield more from a barrel of petroleum than had been possible in any previous commercial operation and to utilize the remaining petroleum products for war purposes.

In making such butadiene as was produced before the war, the yield from a barrel of petroleum was about two per cent and the remainder of the barrel could be used only for a limited number of petroleum products. To make the mass quantities of butadiene needed for the synthetic rubber program would require too much of our petroleum supply.

The oil men, pooling their research facilities, patents and "know how," solved the problem by developing a process that would use about five per cent of a barrel of petroleum and leave the remainder available for the production of high octane gasoline and other products. A small scale laboratory model was developed. Tests revealed that the process would work.

The Defense plant Corporation, a unit of the Reconstruction Finance Corporation, awarded a contract for construction of the plant to the Lummus Company.

While work was under way on the butadiene plant, the DPC sponsored the erection of two copolymerization plants on adjacent sites. In these plants the butadiene produced by Neches Butane will be combined with styrene, a product of the chemical industry, to make a latex, or rubber milk, which in turn is converted into a synthetic rubber gum resembling raw natural rubber. One of the plants is operated by B. F. Goodrich Company and the other by the Firestone Tire and Rubber Company.

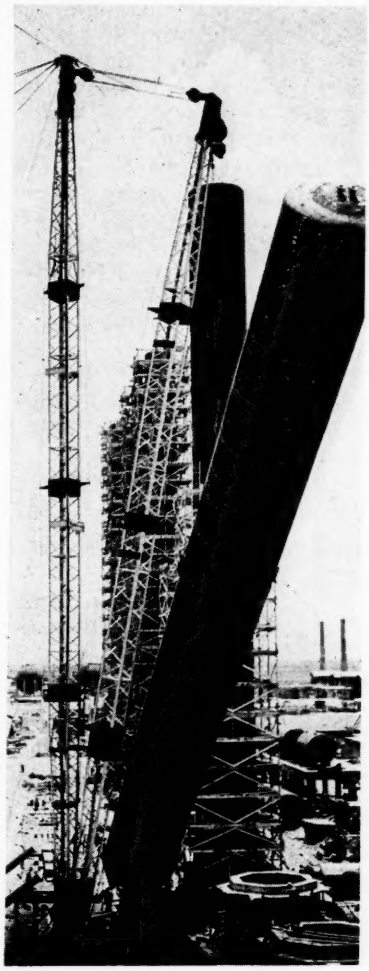
While the butadiene plant was being constructed, each of the five participating companies expanded its facilities for producing raw stock to be supplied to the butadiene plant and to increase its output of aviation gasoline.

Construction started in June, 1942, on a site fronting the Neches River below Port Neches and nine miles north of Port Arthur. Some 6,000 persons were employed in the construction program, and some 700 will be required in the operating personnel.

Concrete piling were sunk 40 feet into the prairie grassland as foundations for 48 steel processing towers, some as tall as a 17-story building. Other concrete piles were placed to support the 42 big steel pressure storage spheres, largest of which will hold 12,000 barrels of raw stock or finished butadiene.

One of the greatest difficulties was in getting the lofty fractionation towers built. The management decided to improvise, scoured the country for used equipment and materials, and did as much of the work as possible right on the grounds. The towers were built in one piece, on cradles arranged on railroad car trucks.

One of the largest mobile derricks ever employed, a 165-footer, was used to hoist the towers, some of them weighing 270 tons, into place. Chief Rigger Al DeCuir, who supervised the hoisting of these towers and about 100,000 tons of other steel work into place, didn't have a single lost-time accident in the entire operation.



A 164-foot, 200-ton steel tower is swung into place in the new butadiene plant which five oil corporations have built near Port Arthur, Texas.

In the process of refining crude oil each of the five participating refineries obtains a gaseous substance known as butane-butylene, which serves as the raw stock for the making of butadiene. This raw stock is piped from the refineries direct to the Neches Butane plant at Port Neches, and to assure a constant supply is stored in the spherical pressure tanks.

From this raw stock must be isolated the butylene. Most difficult operation is to convert the butylene into butadiene by means of dehydrogenation. One chemist described the operation, in which two hydrogen atoms of the butylene molecule are removed, as follows:

"Imagine a big hall with 10 million fleas in it. They send you in with a sledge hammer and a crowbar and tell you to knock off the right hind leg and left front whisker of each flea and then, when you've finished, to sort out all the fleas that you've maimed in the process."

About one-third of the raw material received at the plant is converted into butadiene. The remaining two-thirds is returned to the oil refineries for use as charging stock in the manufacture of 100 octane gasoline.

Directors of the Neches Butane Products Company are: from the Atlantic Refining Company, E. J. Henry, vice president, and W. F. Stroud; Gulf Oil Corporation, W. A. Slater, vice president, and Herbert Henderson, vice president; the Pure Oil Company, C. B. Watson, vice president, and J. P. Langfitt, assistant to vice president; Socony-Vacuum Oil Co., Inc., W. F. Burt, director, and Dr. J. B. Rather, director of research; the Texas Company, H. Halpern, vice president, and G. R. Bryant, general manager of refining department; Neches Butane Products Company, W. H. Hoffman.

Officers are Herbert Henderson, chairman of the board; W. H. Hoffman, president; J. B. Rather, vice president; H. P. Arbuckle, secretary-treasurer; F. W. Cooper, assistant secretary-treasurer.

Mills Hum on Munitions Crates

Small Southern plants aided by ordnance orders

ON December 22, 1942, the Birmingham Ordnance District awarded contracts totaling two and one half million dollars to 42 lumber and woodworking plants in five southeastern states—thereby saving the shirt of John Peters.

In this instance the shirt of John Peters (the name is fictitious though the individual is an actual contractor) was far more valuable than something that could be ruined in laundering, for it represented the lumber plant that meant financial security for Peters and his family.

John Peters, who does not make a specialty of dealing with intangibles, can readily talk cause and effect and he is an expert when it comes to interpreting the status of his own business. Go into the tiny but well equipped office of this square-jawed citizen of Birmingham, Alabama, and hear him explain it all against the steady whine of his busy saws, moulders and trimmers next door.

"There's nothing half-baked about my plant. It's small, but it's solid. I built it myself, slow and sure over a period of 12 years, until last year we did a business of $400,000. I've got all the equipment, machinery and facilities necessary for handling sizeable high-class woodwork contracts—and the labor's available. But none of it does any good when practically all construction is frozen, except on government orders."

John Peters leans forward in his earnestness. There's a touch of fight in his voice and worlds of assurance in his eyes.

"The ordnance contract? (on wooden ammunition crates) It saved my business from hell and ruination, that's all. When we got the ordnance contract, I ran an ad in the three local papers for three days and got more than 500 applicants. Three hundred answered the ad within two days after it first appeared, and now almost two months later they are still trickling in.

"After completing our last major contract, before our ordnance contract, we had only 35 or 40 men on the payroll. Today I'm running a day and night shift and have 125 punching the clock. In January the work on the contract constituted about 10 per cent of our total volume of work; this month the contract will be about 40 per cent of the total volume, and next month 90 per cent."

There you have the story of a business saved. But, typifying as it does by careful research the case history of the 41 other lumber mills, additional angles must be viewed before a complete picture of the effect of this work is obtained.

The Ordnance Department since the beginning of the emergency has endeavored to assist small manufacturers within the District boundaries to adapt their facilities to production of Ordnance materiel. The Small Plant and W.P.B. Contract Section of the Birmingham Ordnance District, carried on our organization chart, was designed to assist small plants. It has figured largely in the survival of a number of small businesses throughout the district which heretofore have found it difficult to fit into the larger procurement requirements.

The Birmingham Ordnance District is a concrete example of concentrated efforts to assist small plants as 90% of its total contacts are with manufacturers with less than 500 employees.

To further the idea of assistance, within the past few weeks this District has placed contracts amounting to two and one-half million dollars with small lumber mills and woodworking plants scattered over the vast territory of Alabama, Georgia, Florida, Mississippi and Louisiana — the five Southern states comprising this District. Many of these plants have been standing idle because they did not know how to go about securing a war contract.

When this Ordnance District was allocated, by the Chief of Ordnance, a large number of wooden ammunition crates, immediate contact was made with the local War Production Board and the Regional Office in Atlanta, outlining the program that would make possible the participation of small contractors.

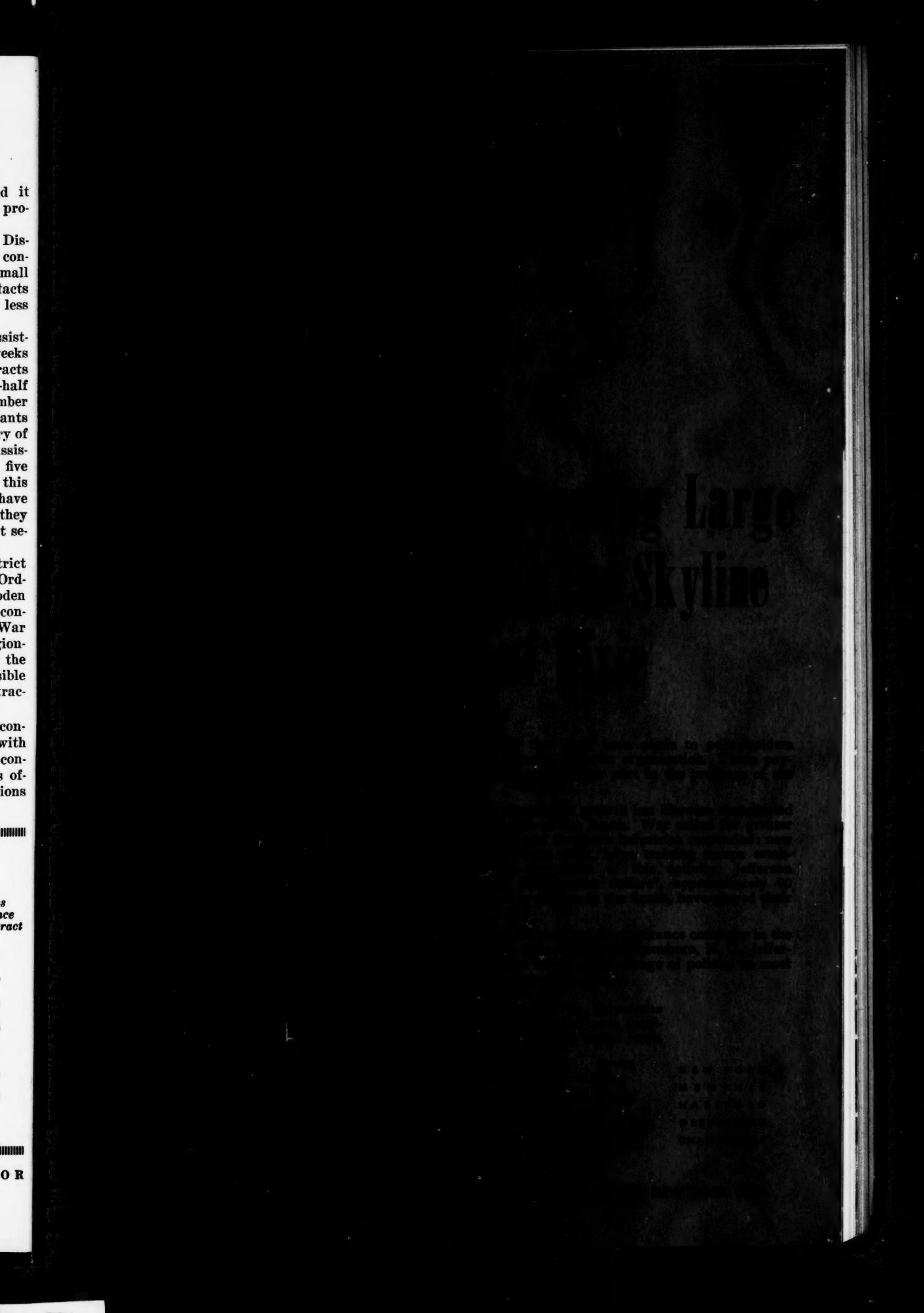
The W.P.B., through its contacts, furnished this office with 152 possible bidders. Likewise, contacts were made through this office which resulted in invitations

(*Continued on page 76*)

How Ammunition Crate Contracts Worked

(*Information from War Production Board*)

	Capitalization	*Amt. Sales 1942*	*Floor Space Sq. Ft.*	*Employees Before Contract*	*Employees Since Contract*
Southeast Wood Products Co., Dothan, Ala.	$20,000	$25,000	30,000	12	22
Southeastern Mfg. Co., Tuscaloosa, Ala.	188,000	1,500,000	90,000	80	110
Waycross Variety Works, Waycross, Ga.	6,000	50,000	8,000	15	36
Alabama Fixture Co., Birmingham, Ala.	25,000	75,000	34,000	12	68
National Woodworks Co., Birmingham, Ala.	3,000	400,000	24,000	35	125
O'Neill Mfg. Co., Rome, Ga.	25,000	360,000	57,000	60	130
L. M. Bush Company, Atlanta, Ga.	13,900	45,750	3,480	3	26
Radolite Manufacturing Co., Jackson, Miss.	4,400	42,000	10,000	29	83



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Giant "Cat Cracker" Boosts Output of Aviation Gasoline

THE new $6,000,000 fluid catalytic cracking unit built at Baltimore by the Standard Oil Company of New Jersey is now in operation as the sixth of the company's privately financed program of eight such projects designed to bolster production of the high octane gasoline required to meet the tremendous demands of war.

Climaxing a $14,000,000 modernization of Standard Oil facilities at Baltimore, the new unit will mean a substantial increase in aviation gasoline output there and at the same time guarantee the company a better position to serve the Maryland area with motor fuel after the war. There is also the possibility that synthetic rubber may later be manufactured.

High towers and miles of pipe, together with great vessels of steel and hundreds of valves, are coupled with engineering ingenuity and construction skill at the new plant into what the oil industry calls a "cat cracker." The project rises 253 feet into the sky, dwarfing older units at the refinery and dominating neighboring industries like a skyscraper on a prairie.

Twenty-five of the one hundred miles of pipe used in the expansion went into the fluid catalyst cracking unit. One section of the pipe is nine feet in diameter. Intense heat during the cracking operation will expand this pipe over 14 inches, a fact that had to be considered in making the structural designs.

The new catalytic cracking unit was built by M. W. Kellogg Company, oil refinery construction specialists of New York, who shared in the multi-million dollar Baltimore improvements with Arthur G. McKee Company, of Cleveland, Ohio, builders of the big through pipe still, and C. E. Braun Co., of Alhambra, Calif., the contractors for the nearby alkylation and light ends plants.

The plant was dedicated December 1 as the high light in a two-day celebration participated in by officials of the Standard Oil organization, with Senator Ralph O. Brewster of Maine delivering the principal address.

Among the notables present were Ralph W. Gallagher, president of Standard Oil Company (N. J.), the parent company; Chester F. Smith, president of Standard Oil Company of New Jersey, the operating company; Gov. Herbert R. O'Conor, of Maryland, and Mayor Theodore R. McKeldin, of Baltimore, and Robert T. Haslan, former Massachusetts Institute of Technology professor, now a Standard Oil director.

Mr. Gallagher, who had just returned from a South American inspection trip, emphasized the importance of oil as a source of energy. "If the standard of living of the peoples of the earth is to be raised, we must find more oil *and* make better use of the oil we have," he said, with the observation that airplanes, trucks, buses, diesel-driven ships and locomotives are only so much machinery until they are brought to life by the oil fuels which give them power.

Robert P. Russell, executive vice president of the Standard Oil Development Co., spoke at length

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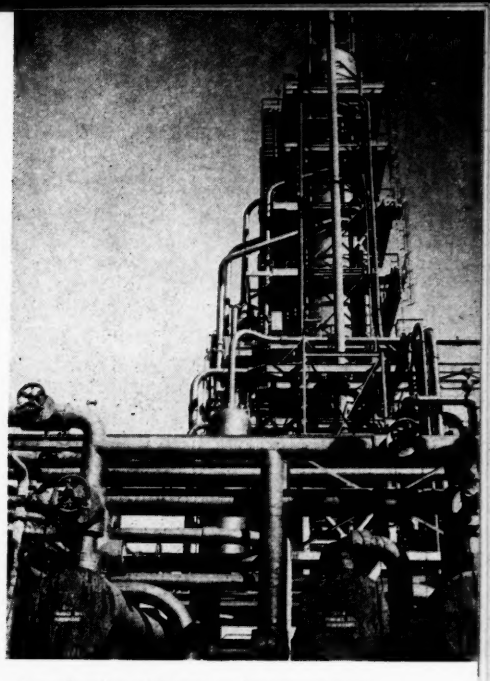
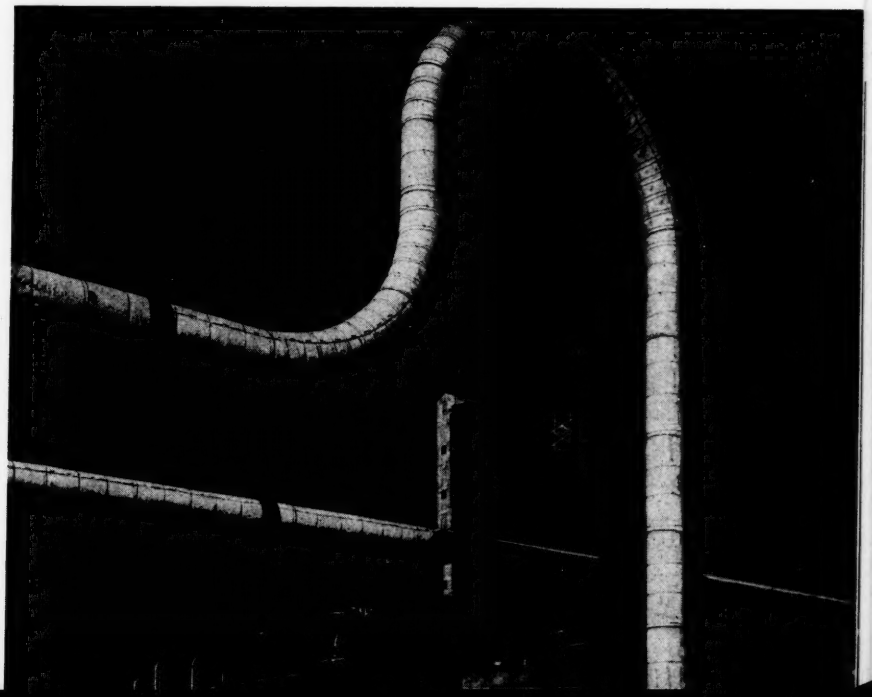


A crude pipe still was an important part of Standard Oil's $14,000,000 building program at Baltimore.



The big "cat cracker" photographed through one of the plant's pipe bends. These latter are a safety factor, absorbing expansion and contraction caused by high temperatures.

The South And the New Year

GOVERNORS OF SOUTHERN STATES TELL WHAT WAS ACCOMPLISHED IN 1943 AND OF THE OUTLOOK FOR 1944

By CHAUNCEY SPARKS
Governor of Alabama

ALABAMA industry and agriculture in 1943 were mobilized on a war basis, with results of which the State may well be proud. Because of her natural resources and the scope of her existing industries, her role in many respects has been the most important of any Southern State.

Gov. Sparks

Her great iron and steel industry is operating at an all-time high, with increased facilities and capacity. New and gigantic plants for production of munitions of war, the great expansion in shipbuilding at Mobile, in aluminum production in the Muscle Shoals area, all attest to Alabama's all-out war effort. Her farmers, despite shortages of labor and machinery, have met and exceeded quotas of vital crops in a magnificent example of achievement against odds. The State's lumber industry, third in size in the nation, is operating to capacity and supplying essential materials.

Alabama's legislature, meeting in 1943 in regular session, took a sane and farsighted view of its responsibilities and enacted measures to meet, as far as it could anticipate, contingencies that might arise by creating such agencies as the State Planning Board, the Alabama Emergency Finance Corporation and the War Emergency Council, for the purpose of relieving want and destitution caused by unemployment during times of economic emergency in the State of Alabama.

Alabama's prospects for 1944 are for redoubled effort, more work, greater production, more difficulties to be surmounted. Beyond that, the picture is not clear. I am not one of those who believe that war's end will bring the millennium, that the injunction to toil laid upon Adam will ever be repealed. I do think it reasonable to hope that the future will bring to Alabama a better balance between industry and agriculture, that wartime industrial expansion will at least partially prove permanent, that better agricultural practices applied under stress of war will prevail. I hope that the lessons of frugality and economy, of doing without non-essentials and making ends meet, will not be altogether lost. Finally, I hope we will come to a new era of American unity, cemented by blood shed in the common cause, that sectional bickering, and the patronizing intrusions so intolerable to us of the South will finally cease, that we will become truly a Union of States, each with its individuality intact, its local usages and institutions respected or at least unmolested by others, with differences that need not divide, and a realization that a forced uniformity, whether as between individuals or between sections of our great nation, is both undesirable and unattainable.

By HOMER M. ADKINS,
Governor of Arkansas

ARKANSAS contributed heavily to the progress of the war effort during 1943, both in human and material resources.

Native sons like Generals Douglas MacArthur and Brehon Somervell have contributed to the military leadership and we have had many heroic sons, from the top on down in all branches of the services, to uphold the caliber of our fighting manpower.

Gov. Adkins

In material resources no state has contributed more than Arkansas. Outstanding have been our contributions of lumber and wood products, our petroleum and coal, and our metallic minerals, foremost of which is our bauxite, of which we have 97 per cent of the nation's supply.

The present may be covered with a summary of the financial condition of the State Government and other facts relating to the state as a whole. On December 1, balances in the State Treasury, composed of

cash and securities, totaled $37,605,184.43, the largest amount in the state's history. Our people are enjoying a substantial prosperity which is reflected in bank deposits which have doubled during the past three years. Likewise, our natural resources, including agriculture, timber and minerals, have had their greatest development during the past two or three years, which is reflected in our greatly increased per capita income.

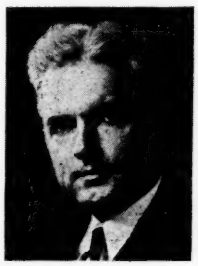
With reference to the future, I consider it extremely bright. Many of the wartime industries, totaling $500,000,000, made possible by reason of the defense program, are peculiarly adapted to this territory and through the planning of a recently organized Arkansas Economic Council composed of some 300 of the state's best business talent, it is hoped these wartime plants may be reconverted into peacetime industries.

We have the greatest reservoir of natural resources of any state in the nation, our power resources are being developed to the greatest extent, and with our unlimited supply of raw materials and ample supply of skilled and unskilled labor, we cannot fail in our efforts. Fortunately, we have an excellent transportation system, including five major line railroads, fourteen huge new airfields, mild climate, tax laws favorable to industry, and a market within a 500 mile radius of the state's boundaries, wherein half the population of the nation reside.

Arkansas is in an enviable position and no state has a brighter future.

By SPESSARD L. HOLLAND,
Governor of Florida

OUR vegetable growers, in the 1942-43 season ending July 31st, planted acreage to yield 80,000 cars and despite bad weather, harvested and shipped 70,000 cars. Our citrus growers harvested and shipped 60,000,000 boxes, which was 12,000,000 more than had ever previously been produced. For our 1943-44 season we expect even greater production. Field crops and live stock have increased commensurately, the calendar year 1943 recording a seven per cent gain in acreage over 1942, itself a record year. Actual production is expected to be more than ten per cent higher.



Gov. Holland

Detailed figures on war manufacturing may not be made public, of course. But this we may say—Florida's industrial production for 1943 was more than twice that of pre-war years. Our various industries, in conjunction with the State Defense Council and other public agencies worked out in 1942 a program converting our manufacturing facilities to war, with the result that our 100 per cent increase, and much of our normal production, has been in ships and other implements and supplies of war.

In 1942 we largely converted our important tourist industry to the service of the armed forces—our "plant" of hotels, housing, and other facilities, and our trained personnel. In 1943 this service continued as a valuable contribution to the carrying out of war.

In 1943 Florida established new records in food production and war material manufacturing and continued in its important role as host to the armed forces in training.

These accomplishments have been our duty, our part of the war task. We are proud, of course, that we have been able to do so well but shall devote ourselves wholeheartedly to accomplishing even more in 1944.

By ELLIS ARNALL
Governor of Georgia

GEORGIANS on the home front are doing their share toward winning the war, meanwhile planning for the inevitable industrial upsurge that the South will know after it ends.

Industrially Georgia's war-plant expansion has been in the fields of airplane manufacture and shipbuilding; the freight rate discriminations practiced against the South have been an obstacle too great to surmount in other industries. However, all its plants, including its great textile industry, have been geared to the war tempo and placed at the service of the nation's defense. Production in Georgia has been at a high level in 1943, and employment has reached a record mark.

Toward the postwar transition period, Georgia looks forward with confidence. We believe that the Southern states can develop that type of agrarian-industrial economy that is needed to permit the decentralization of industry in America; we believe that this decentralization is essential if the trend toward an imperial-colonial division of the nations is to be reversed and its consequent menace to the American ideals of individual freedom and private initiative is to be averted. We are not selling America short; we believe that national unity, marked by economic advances in the South, will follow the war.

Gov. Arnall

Georgia's state government is putting its resources into preparations for that postwar era. The State debt will be fully extinguished by the end of the war; a new budgeting system has been developed to insure stability of public services and of taxation; careful plans are being made for the intelligent coordination of any postwar public works program with industrial expansion.

By SAM HOUSTON JONES
Governor of Louisiana

SINCE Pearl Harbor, the great majority of Louisiana's abundant natural wealth and productive energy has been concentrated on the nation's war needs, with every farm, factory and facility geared to the war effort. The past year has seen the peak of this intensified work in production that sets an all-time high. We have produced more food and fiber, more petroleum, more lumber, more minerals—more of all war-essential materials.

Gov. Jones

These materials are being transformed into war goods in Louisiana's own factories, including plants for the manufacture of aluminum, chemicals, synthetic rubber, dehydrated food, high octane gas, and munitions.

We also produce the ships to transport these goods to war fronts. Our shipyards have already launched scores of merchant vessels, and many more are building. We are making, besides, important types of warcraft, notably the Higgins shallow-draft landing barges that have proved their worth in many war theatres.

Altogether nearly $300,000,000 worth of defense installations have been built in Louisiana since 1941.

We shall continue our all-out war production until the national crisis is over. But some of our thought and effort is directed beyond the war.

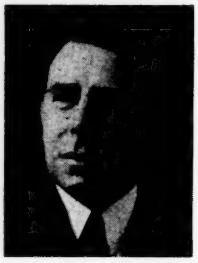
We are planning a better Louisiana. We seek industries that can permanently adapted to our resources and conditions — that can produce for war needs now, but later find a place in our peacetime economy.

We have established a non-partisan, non-profit committee of leaders in education, welfare, health, commerce, and other fields, who are making a study of our potentialities, and working for the elevation of our people to a plane of living more commensurate with the natural wealth and advantages that Louisiana has to offer.

We want for our returning service men, and for all Louisianians, a state with adequate opportunity for good work, good citizenship, and security.

By J. MELVILLE BROUGHTON
Governor of North Carolina

INDUSTRIAL production in North Carolina during 1943 has reached a total volume and value of approximately two billion dollars in manufactured and processed commodities. It is not possible at this time to give definite figures as to the proportions of this production as between war uses and civilian requirements. The greater part of this production, however, has been directly related to the war program. In this record-breaking achievement there has been the most wholesome and harmonious cooperation between management and the nearly one million men and women engaged in industry in North Carolina. No strikes or controversies have interfered with or retarded this flow of production.



Gov. Broughton

This enormous industrial production for war purposes has been achieved with very little dislocation. Plants which have hitherto been national leaders in domestic production have been able with very little shift in mechanism or labor to swing into war production in a manner that has elicited the highest praise of the Army and Navy Departments. Very few plants of a distinctively and temporary war production character have been established in this state. This may be considered a fortunate circumstance, involving less serious problems in the postwar period. Our great industries which were able to swing from domestic into war production will be able to revert without undue delay or dislocation to normal and peacetime production.

The state continues to lead the nation in the production of textiles, hosiery, processed tobacco, wooden furniture, towels and a number of other important commodities.

While conversion to peacetime production will be easier in North Carolina than in many states, it is inevitable that there will be some unemployment in the transition. As a protection against this contingency, the State has an unemployment compensation surplus or reserve in the amount of over seventy million dollars.

Looking to the future, North Carolina is prepared for a postwar period of expansion and progress. The State has at present a general fund cash surplus of approximately forty-five million dollars, a substantial part of which will be available for such postwar program of public works as may be deemed essential. In addition to this, the State has a cash surplus in its highway fund of approximately twenty-five million dollars, all of which is immediately available for highway construction when essential materials are available.

Industry in North Carolina, with a distinguished war record, is making plans for an even greater record of expansion, production and progress in the postwar period. The record in this state has attracted already many new concerns and others have indicated their intention of operating here when the war is over. We face the New Year with complete confidence.

By ROBERT S. KERR
Governor of Oklahoma

OKLAHOMA ranked third among southern states during 1943 in war production, with total war contracts of $1,680,000,000. War

construction in Oklahoma during those months totaled $105,335,000. Since most of Oklahoma's war industry is in aviation it seems likely production will at least be maintained at present levels until peace comes. During the year, Goodrich has located at Miami a $5,500,000 plant for production of synthetic rubber. All other western states competed for this plant, which came to Oklahoma because of plentiful water, favorable labor conditions and central location. When peace comes the two Douglas plants plan to convert to production of cargo planes.

Gov. Kerr

Oklahoma figures on increasing war production in 1944, so long as the war continues. When peace comes it hopes, due to cheap power, that present war plants will be converted to peace production, and that other industries will locate here. Plans have already been completed, and were held up merely because of lack of manpower and materials during the war, for several additional water power installations. This power construction program, totaling $250,000,000 involves also several irrigation projects.

Oklahoma, ranking fourth in oil production, is laying plans for a big secondary production program after the war, which, it is estimated, would bring in 501,562,000 barrels above what can be expected under present recovery methods.

Already 86 per cent of Oklahoma's agriculture area is organized into soil conservation districts, and a vast construction program will be launched as soon as war permits. A record tree-planting program is set for this year. Housing plans are being perfected, and the Highway Commission is only awaiting the go signal for a program totaling $20,000,000. This will be increased by July 1 to $50,000,000.

By OLIN D. JOHNSTON
Governor of South Carolina

WE feel that South Carolina is emerging as a great industrial and agricultural leader in the nation. We look forward to the post-war period, confident that we shall progress in a definite way which will be helpful to our nation. Our State is rich in its history and tradition, holding a unique distinction as being one of the original 13 states, and along with our historical background, we are planning for a post war program that will give greater opportunity to the young men and women who are now serving in the armed forces of their country and who we hope soon will return from a victorious war to take their rightful places in our State and Nation.

Gov. Johnston

The present war finds South Carolina doing its full share at home and on every far-flung battlefield. Our industries and factories have geared themselves to a maximum war production which today is furnishing the necessary equipment and food to help our armed forces in this great struggle. Many of our factories and industries have won the high award of the Army and Navy "E" and have in other ways been honored for the efforts which they have put forward in this war crisis.

I am happy to report that in our State there has been no serious trouble to impede our war effort. Capital and labor have worked together in full cooperation and each has put first the winning of this war.

In South Carolina the Legislature has set up a Preparedness for Peace Commission. This Commission has made plans to prepare for the return of our armed forces to civilian life. It is also engaged in investigating and recommending solutions to the tax problem of our State. In South Carolina there is today no *state* tax on real estate. While thousands of our sons and daughters are engaged in this great war, our farmers have been fighting the battle on the home front and have been producing the necessary food, not only to feed the armed forces at home and abroad, but also the people at home have lived in prosperity and happiness. The sons and daughters of our laboring people like the sons and daughters of our farmers, have taken their places on land, on sea, and in the air to combat the enemies of democracy, and while these sons and daughters are carrying the battle to the enemy, the fathers and mothers of these boys and girls are working in mills and in the fields to produce what is necessary to win an all-out victory.

The people of our State in every bond drive and in every war fund request have willingly met and even surpassed the quota assigned to them. The State of South Carolina is in the best financial condition since the beginning of its history. We have not only met all of our outstanding obligations and debts, but have in our sinking fund a large surplus.

Our State highway system is one of the best in the Nation and during the post war period with the surplus we have created, we expect to build up a better system, and with the full cooperation of the Legislature, the Governor and the Highway Department, we will move on to assure our people of the finest system of transportation for highways in our country.

By PRENTICE COOPER
Governor of Tennessee

TENNESSEE industry in the past twelve months was able to maintain capacity production and to achieve the highest levels of output in its history. Thirty of the State's war plants were awarded the Army-Navy "E" in 1943.

Employment, reflecting the

year's industrial gains, reached 453,000 monthly, an average monthly increase of 24,000 over 1942. Similarly, payrolls increased, averaging about $180,000,000 quarterly.

Gov. Cooper

Construction, including thirty new plants of major importance, amounted to nearly $100,000,000, a figure topped in the South only by Florida. Building of the new Rohm & Haas "Plexiglas" plant and the mammoth Clinton Engineer Works "mystery" war plant employing tens of thousands of workers, spotlighted the Knoxville area. Late in the year, ground was broken near Ashland City, Tennessee, for a $47,000,000 natural gas line designed to bring Texas gas to northeastern cities. Post-war availability of this gas in Tennessee is highly probable.

Most of these industries are of non-military character, and their location in the State at this time, despite the difficulties of wartime conditions is a favorable portent of continued industrial expansion in the postwar period.

Especially outstanding was the completion by TVA of Ft. Loudon and Douglas dams, the latter finished in the record-breaking period of thirteen months. With the closing of the Ft. Loudon dam, the 646-mile navigable channel envisioned in the TVA Act of 1933 was brought to essential completion.

From the past year's trends, I can see significant hints of near-future return to typical peacetime expansion in manufacturing, which may well offset any current declines in war construction or employment. With my fellow Tennesseans and the nation, I am hopeful that our battlefront successes in 1944 will allow gradual reconversion to civilian production. But so long as hostilities continue, our basic industries can be expected to operate at high levels.

By COLGATE W. DARDEN, JR.
Governor of Virginia

THE State's outstanding developments during the year 1943 have been mainly in its contribution to the war effort. Early in the war Virginia's shipbuilding industry was expanded to meet the increasing needs of the Navy. Her colleges became Naval training centers, emergency housing units sprang up like mushrooms in all sections of the State, important access highways were built in cooperation with the Federal Government, and large expansion took place in the manufacture of materials needed for armaments and ordnance, Army and Navy training camps, Army and Navy supply depots and the like. During 1943 Virginia has continued to produce for those requirements in increasing volume, with fewer workers.

The year has witnessed the completion of its program of industrial expansion to meet war needs, and a settling down to its part toward the prosecution of the war. Production and employment in shipbuilding, textiles, rayon and related products, is at a high level, in most instances close to that at the close of 1942. Employment in construction fell off during the year so that the current level of employment is somewhat below that of 1940.

During the year Virginia has been host to countless thousands of service men and women from all sections of our own, as well as allied nations. The congestion of its cities and towns has been due mainly to the need for accommodating, so far as possible, new war workers and the families and friends of thousands of men in the armed forces stationed at the many military establishments in Virginia. Real progress has been achieved toward meeting the many and varied problems which have confronted the congested areas of Hampton Roads, the metropolitan areas adjacent to Washington, and, to a lesser extent in Richmond, Petersburg, Hopewell, Bristol, Danville, Martinsville, Williamsburg and other sections. The acute need for housing and related problems has been met to a large extent by the cooperation and joint participation of the State and local governments acting in concert with the Federal government and private business interests.

Gov. Darden

Through the payroll deduction plan State employees invested during the year a total of more than $600,000 in War Bonds and the Commonwealth of Virginia on its own account now holds approximately $38,000,000 in War Bonds for its numerous special funds including the Sinking Fund of the Commonwealth.

At the close of the fiscal year, June 30, 1943, the Commonwealth of Virginia had a net unobligated surplus in the general fund of $8,199,645.

During 1944, in addition to continuing its participation in the war effort, Virginia is looking forward to far reaching legislation from the General Assembly which will convene on January twelfth. This legislation will deal with a number of matters, chief among them being soldier voting; extensive capital improvements for mental hospitals, educational institutions, tubercular sanitoriums, etc.; the establishment of a farm for inebriates; facilities for epileptics; preparation for the demobilization of the armed forces; continued improvement of the Penal System and many others.

The Impregnable South

It can be as nearly self-sufficient in food as any large area on earth

IN a world suffering from hunger and likely to be haunted by fears of famine for years to come, the sixteen Southern states occupy an unusually favored position with regard to foodstuffs. Viewed as a single economic section, the South probably comes as near to being impregnable as any area on earth in the plain, everyday matter of getting enough to eat.

This does not mean that the South is primarily agricultural. The deeply intrenched belief that Southerners are merely tillers of the soil is exploded by the fact that the section produces manufactured goods three times the value of the products of its farms. But the farms are there too, and an analysis of the flow of farm commodities shows that the South already is doing a good job of feeding itself and that no tremendous agricultural revolution would be necessary to become self-sustaining. A few tropical foodstuffs—notably coffee, chocolate and spices—would be lacking, but these gaps in the agricultural economy occur throughout the temperate zones, and must simply be charged to acquired tastes rather than to basic needs.

More local processing of meats would fill a gap in the South's food economy.

So far the South has seen fit to devote a great part of its land and effort to two non-edible crops—cotton and tobacco. The nation has needed these products and the South has supplied 98 per cent of each. They have accounted for 60 per cent of the cash income derived from all farm crops, and for roughly one-third of what the farmer receives for his crops, cattle, hogs, poultry and so forth combined.

The money from cotton and tobacco goes not only for factory goods, but for meat, grain, vegetables, fruits, butter, and eggs. The South produces all of these and some states produce surpluses, but by and large Southern production falls short of needs. It is not an extreme shortage in most cases. Imports of butter, for example, amount to only 12,000,000 pounds annually and self-sufficiency could be achieved by increasing present production by 5 per cent.

The most severe deficiency appears to be wheat. Most of the South has resigned this crop to the prairie states, and even the production of Oklahoma, Texas and Missouri, which rate in the order named, leaves a deficit for the section as a whole of 53,000,000 bushels a year. To overcome this would require a boost over current production of 34 per cent, and to the strictly agricultural problems of such an attempt—should it ever become of practical desirability—would be added complications of milling. A 7 per cent increase would make the South self-sufficient in corn.

In several lines there has developed what in effect is a trade system resulting from regional specialization in certain crops.

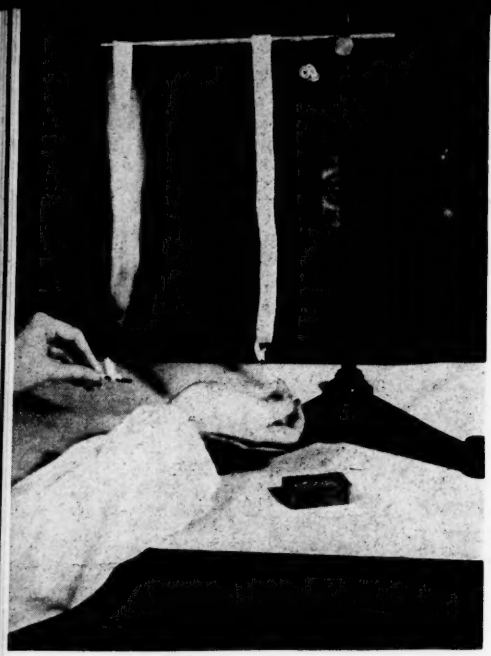
Industry and agriculture go hand in hand in the Southern tobacco business.

The South exports 4,000,000 bushels of peaches a year, but is short of apples and imports 7,000,000 bushels. It raises most of the country's sweet potatoes, but has to supplement its Irish potato crop by buying some 10,000,000 bushels annually, or 15 per cent more than it raises. A large exporter of fresh vegetables, it calls on other states for onions at the rate of 50,000,000 pounds a year. The South not only grows its own citrus fruit but, with California, supplies the nation.

The South brings in 200,000,000 pounds of live hogs annually, but exports 777,000,000 pounds of cattle and 102,000,000 pounds of sheep and goats. In fresh meats for the consumer, the South shipped about the same amount it received. However, in cured, dried and smoked meats and other edible packing house products the South leans on imports to the amount of about a billion pounds a year.

Overspecialization in cash crops, with emphasis on cotton and tobacco and to a lesser degree on sugar cane and rice, has been charged to the South. Diversification of agriculture, even at the expense of cotton and tobacco, has been widely recommended and much emphasis placed on suste-

(*Continued on page 75*)



Glass Cloth *plus* Resin For Plane Building

Combination has immense strength and solves certain grave problems

THE two strips of "cloth" being submitted to a laboratory fire test in this picture illustrate an amazing development of industrial chemistry. The material at the left is organic—which means it could be cotton, wool, silk or any substance derived from living beings. The strip at the right is woven of minute strands of *glass*.

The fact that one burns and the other is fireproof is only one of many ways in which the material known commercially as Fiberglas has proved its remarkable properties. Just now it is receiving particular attention for its possibilities in building better, faster and cheaper airplanes. It may be the answer to the quest for a new, high-strength, light-weight structural material that can be molded into intricate shapes without high pressures or expensive molds.

Such a material has long been sought by the aviation industry to meet the demand for further reduction in the weight of all types of planes. Lightweight metals play an indispensable role in aircraft construction, but they do not solve all the problems. Although it sounds like a contradiction in terms, their great value lies not solely in their light weight, but in the fact that for a given weight they have a thicker section, and therefore require less stiffening to prevent buckling. This means lower, but still high, fabrication costs; fewer, but still too many, man-hours of manufacturing time.

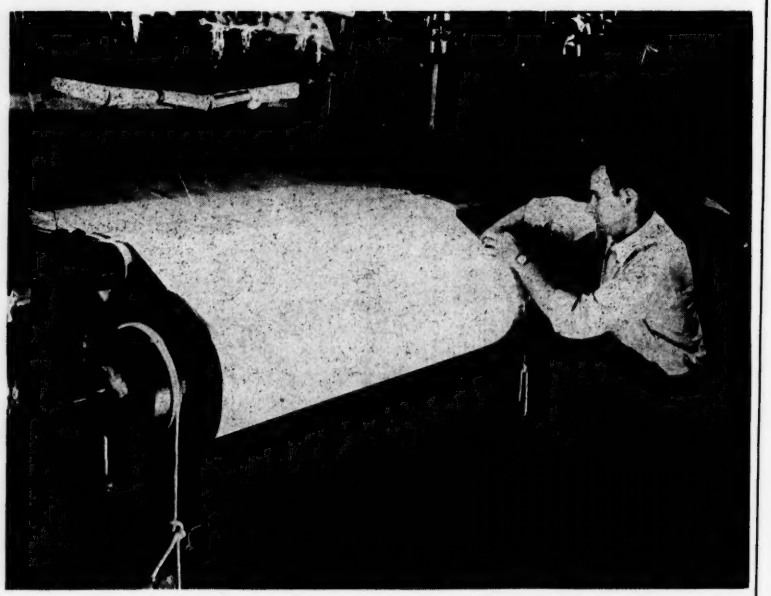
The goal of the aviation industry has been a plastic material consisting of a combination of a resin and a flexible reinforcement with which large and difficult shapes can be formed by wrapping the reinforcement around a form, impregnating it with the resin in liquid condition, and hardening it by a quick, simple and inexpensive process. Both resin and reinforcement must meet certain basic requirements.

The resin must lend itself to rapid fabrication of difficult shapes, with low man-hours of labor and minimum tooling. This implies a resin that hardens at moderate temperatures and under little or no pressure on the surfaces. Otherwise, so far as aircraft use is concerned, little is to be gained by increasing the resin's strength by the addition of a reinforcing material. Given a suitable resin, the most important physical property—a high ratio of strength to weight—depends upon the reinforcing material employed.

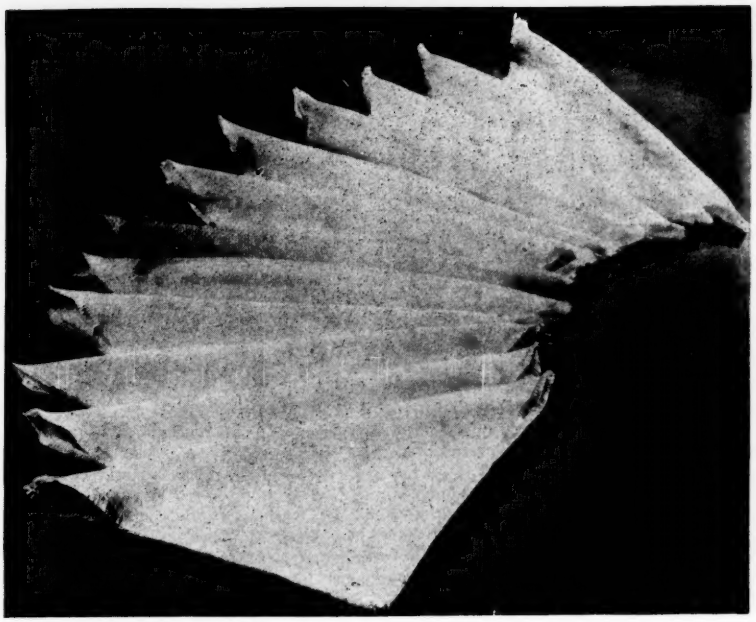
A number of reinforcing materials are being used, including paper, cotton and other organic fabrics, and glass fabrics. For some highly important applications only resins reinforced with glass fabrics have been able to provide the properties required. Certain of these Fiberglas-resin combinations have provided a structural material with hitherto unobtainable strength in proportion to weight.

The glass fibers which are the basis of glass fabrics possess inherent properties that are of major importance in such an application. Standard Fiberglas textile fibers with a diameter of approximately 23 one-hundred-thousandths of an inch show a tensile strength in excess of 250,000 pounds per square inch. They are resistant to high temperatures, and will not burn, rust, rot, or mildew.

Because the fibers are solid glass rods, with no cellular interstruc-



The yarns being woven on this textile machinery are not wool or cotton, but glass.



The glass textiles shown here look like so many handkerchiefs but possess immense strength and heat resistance.

ture, they cannot absorb moisture within themselves, nor do they shrink or swell under the influence of moisture changes. The fact that they cannot absorb moisture means that there is no opportunity for moisture to enter Fiberglas-resin combinations through exposed ends of the fibers, as may occur if the reinforcing material is of an organic nature.

In the almost incredible fineness of the glass fibers lies the secret of the strength they are able to impart. The principle involved is the same as that which Nature employs to produce her strong materials. All materials, whether made by man or Nature, contains imperfections. If the material is homogeneous in its structure, stresses accumulate around the imperfections. Cracks propagate across the material and the material fails.

Nature guards against failure of her strong materials by fiberizing their structure. A tree consists of cellulose fibers bonded together with lignin. The structure of the tree is not homogeneous. When applied stress accumulates at an imperfection, a failure can propagate only across one fiber at a time. The finer and more numerous the fibers, the more widely the imperfections are distributed and the greater is the strength of the tree.

Moslem sword makers borrowed from nature when they fabricated their famous blades of Damascus and Toledo steel. The great strength and flexibility of their blades was achieved by laboriously welding together alternate strips of steel and wrought iron, and then forging the resulting billet into their weapons. Thus they distributed the imperfections so that there could be no propagation of a failure through the blade.

When glass is drawn into fine fibers and the fibers are combined with a resin, the imperfections are distributed so that there is not one chance in a million that those in one fiber will match those in another. The finer the fibers, the wider is the distribution of the imperfections, and the smaller is the possibility that a stress accumulating at an imperfection will propagate a failure through the mass.

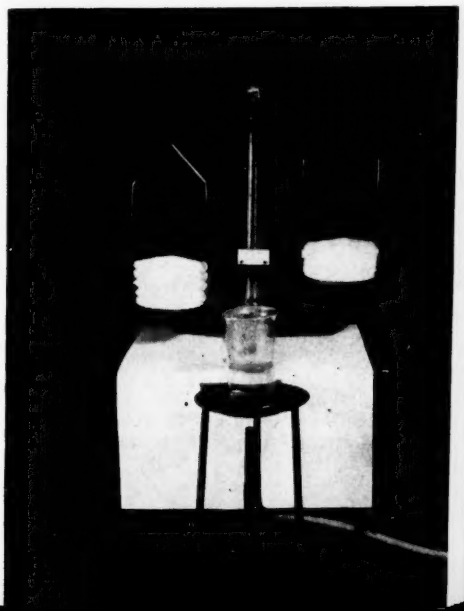
Experimental samples of the Fiberglas-resin combinations have been produced with tensile strengths of over 80,000 pounds per square inch. The impact strength of ordinary plastics is about two foot pounds on a standard test. Samples of the glass and resin combinations have shown impact resistance of over 20 foot pounds.

While the strength-weight ratio of the Fiberglas-resin combination is superior to that of any metal used in aircraft construction, the new structural material is not being used as a general replacement for metals. It is being employed in those particular applications where it has been demonstrated that it can do a better job with less weight, and can be fabricated with fewer man-hours.

Fiberglas-resin combinations are still in the early stages of their development. Much remains to be learned about their potential strength limits.

While available glass fibers have a tensile strength exceeding 250,000 pounds per square inch, it is known that as the diameter of the individual fibers decreases the tensile strength per square inch rises sharply. Fibers are being produced experimentally ranging in diameter down to 2 one-hundred-thousandths of an inch. Fibers of this diameter have been measured with tensile strength as high as 3,500,000 pounds per square inch.

These extremely fine fibers are not available for present-day applications, but the experimental work now being carried on is preparing the ground for the post-war commercial development of higher-strength, lighter-weight structural materials that will find applications not only in aircraft construction but in many other fields.



Exposed to moisture, organic fibers (left) swell and gain weight, while those of glass remain unchanged.

Southern Construction Levels Off but Continues Active

CONSTRUCTION in the Southern states leveled off to pre-war proportions during 1943 when the value of contracts awarded for projects below the Mason and Dixon line totaled $1,504,148,000, according to tabulations compiled from reports published in the CONSTRUCTION daily bulletin of the *Manufacturers Record*.

Despite regulations and restrictions imposed on the industry by a war economy, Southern construction during one of its most trying twelve month periods almost equaled the valuation placed on projects undertaken in 1940, the year when the nation's defense preparations were accelerating toward the all-time record established in 1942.

No estimates have been made on what 1944 holds in store for construction in the South, although the prospects indicate an increase over recent records. Growing industrialization and shortage of homes are factors that are likely to promote construction activity.

Construction for the United States is expected to approximate $3,900,000,000, a figure about fifty-one per cent of the estimated 1943 value and twenty-nine per cent of that for the record year of 1942.

New construction in continental United States exceeded $7,700,000,000 during 1943, according to the Department of Commerce. Officials of that department announced that this figure is a decline of forty-three per cent from the record high of 1942 but still above the level of most pre-war years.

The $1,504,148,000 total for the South in 1943 amounted to over thirty-eight per cent of the preceding year's $3,877,848,000 and was slightly over one-half of the $2,922,808,000 of 1941, the second highest peak of the war boom period. The 1943 aggregate almost reached the 1940 figure.

Military and naval construction in the whole country accounted for almost two-thirds of the 1943 total. In the South the $639,498,000 for public building and the $308,306,000 for public engineering, the two categories which embraced such work, together comprised approximately sixty-three per cent of the South's total for all construction.

One phase of public building which may slightly bolster government financed work is construction of the hospitals needed to treat the casualties expected in coming military campaigns. Both the army and navy have been erecting such structures and the Veterans Administration is launching a construction program involving a number of projects. An existing hospital at Roanoke, Va., is scheduled for expansion under this plan.

While the totals in construction for both the South and for the country were lower, as compared with the several preceding years, they bore out forecasts that 1943 would see construction activity above normal, but below the war-inflated totals of 1942 and 1941. The average of construction awards for the five years preceding that time amounts to $1,008,226,000, a figure that is about one-third less than the 1943 total.

All types of construction from military and government sponsored industrial activity to much harassed private building fell. There were fewer industrial projects, although construction was started on some found necessary to round out the country's war production program. These, together with such additions and alterations that were allowed to start by the War Production Board, were valued at $338,508,000 in the sixteen states of the South. The drop from the preceding year was over sixty-eight per cent.

Government financed ordnance plant construction in the country has been halved this year. Iron and steel plant extensions are reported up for the country. Much of the government's synthetic rubber and high octane fuel plant construction has been done in the last twelve months, with a number of the projects located in the South. Declines were registered in other categories of industrial construction.

Private residential work amounting to

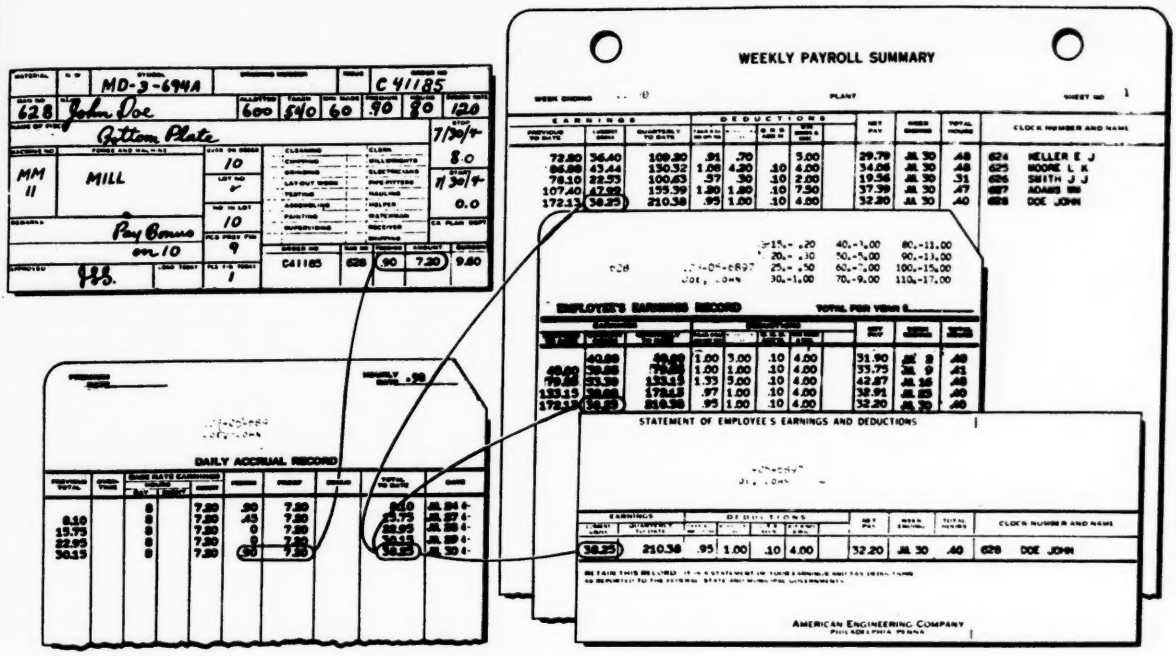
(*Continued on page* 72)

South's Construction by Types

	December, 1943 Contracts Awarded	December, 1943 Contracts to be Awarded	Contracts Awarded Twelve Months 1943	Contracts Awarded Twelve Months 1942
PRIVATE BUILDING				
Assembly (Churches, Theatres, Auditoriums, Fraternal)	$ 109,000	$ 593,000	$ 1,774,000	$ 4,386,000
Commercial (Stores, Restaurants, Filling Stations, Garages)	90,000	110,000	2,023,000	4,804,000
Residential (Apartments, Hotels, Dwellings)	14,568,000	1,480,000	85,277,000	108,833,000
Office	105,000	13,000	268,000	1,253,000
	$14,872,000	$ 2,196,000	$ 89,342,000	$ 119,276,000
INDUSTRIAL	$18,510,000	$12,753,000	$ 338,508,000	$1,086,394,000
PUBLIC BUILDING				
City, County, State, Federal	$20,846,000	$10,103,000	$ 414,702,000	$1,785,320,000
Housing	15,708,000	15,875,000	209,012,000	236,534,000
Schools	639,000	9,524,000	15,784,000	32,928,000
	$37,193,000	$35,502,000	$ 639,498,000	$2,054,782,000
ENGINEERING				
Dams, Drainage, Earthwork, Airports	$12,005,000	$13,135,000	$ 265,478,000	$ 338,988,000
Federal, County, Municipal Electric	83,000	151,000	5,313,000	21,990,000
Sewers and Waterworks	2,893,000	5,872,000	37,515,000	86,036,000
	$14,981,000	$19,158,000	$ 308,306,000	$ 447,014,000
ROADS, STREETS AND BRIDGES	$ 4,708,000	$ 8,072,000	$ 128,494,000	$ 170,472,000
TOTAL	$90,264,000	$77,681,000	$1,504,148,000	$3,877,848,000

South's Construction by States

	December, 1943 Contracts Awarded	December, 1943 Contracts to be Awarded	Contracts Awarded Twelve Months 1943	Contracts Awarded Twelve Months 1942
Alabama	$ 2,115,000	$ 3,448,000	$ 51,973,000	$ 182,884,000
Arkansas	425,000	430,600	39,674,000	105,157,000
Dist. of Col.	1,975,000	1,465,000	17,157,000	68,193,000
Florida	7,263,000	4,776,000	187,891,000	302,737,000
Georgia	9,548,000	10,511,000	98,771,000	199,100,000
Kentucky	2,387,000	686,000	43,663,000	111,848,000
Louisiana	4,645,000	6,790,000	85,187,000	277,875,000
Maryland	9,451,000	6,603,000	105,871,000	225,199,000
Mississippi	722,000	2,167,000	41,131,000	196,463,000
Missouri	694,000	2,983,000	21,481,000	186,169,000
N. Carolina	1,638,000	6,813,000	57,099,000	181,901,000
Oklahoma	4,558,000	1,813,000	109,893,000	212,086,000
S. Carolina	1,546,000	1,848,000	49,793,000	102,199,000
Tennessee	5,052,000	5,250,000	101,994,000	286,002,000
Texas	$2,461,000	16,668,000	386,718,000	943,228,000
Virginia	5,054,000	4,655,000	89,520,000	258,330,000
W. Virginia	730,000	775,000	16,332,000	38,477,000
TOTAL	$90,264,000	$77,681,000	$1,504,148,000	$3,877,848,000



Mechanized Accounting Speeds Payroll and Cost Procedure

By F. Lester Hemings *and* R. A. Wenger

American Engineering Company, Philadelphia

THE war in which we are now engaged is being fought on battlefronts widely separated throughout the world. As a consequence, the demand for ships and ships' parts has been unprecedented. Actually, the call for ships constituted one of the first phases of our defense program initiated long before Pearl Harbor.

For this reason, and by the nature of its products, The American Engineering Company began early to experience a great demand upon its manufacturing facilities. Almost at the start, however, the changeover to war time operations involved complex problems both in the production plant and in the office.

Recognizing the necessity of keeping office details to the minimum, the payroll and cost accounting system was analyzed with a view to simplification and being able to place reports before the management faster than heretofore.

Figure 1—(above) shows how daily job order time cards are extended by direct mechanical multiplication and the employee daily accrual record is posted in one continuous operation. Then, using the same machine, the weekly payroll summary, employee's earnings record, and statement of earnings and deductions are prepared simultaneously.

The outcome was a decision to mechanize both payroll and cost accounting procedure. In addition to handling a greater volume of work, the new procedure provides more legible printed records, centralizes the accounting operation into a compact working unit, and promotes a smooth flow of work. The following is a brief resume of the procedure:

The rise in employment as well as production increased the volume of time clock cards, job order time cards, and material requisitions about 70 per cent over that of the past several years.

To take care of the increased volume of payroll and cost work and to enable earlier compilation of reports to the management, and, at the same time, to utilize the economic advantages of new developments in office machines and methods, it was decided to establish a simple, direct account posting method of reporting costs. Calculations and extensions, previously done manually, are now speedily done mechanically. The machine will add, multiply, subtract, extend and post many records in one operation.

Three separate plant division payrolls are calculated and posted to the records by three separate machine operations. We are daily calculating, extending and posting about 750 time clock cards, that is, multiplying the hours by the rate, to establish the daily wage, and posting the daily wage to the wage accrual record card in about two and one-half hours, or at the rate of 5 cards per minute,

this being the first operation.

The second operation is the calculation and posting of each workman's daily job order time cards; that is, multiplying the hours on each card by the rate of pay per hour, and, also by the burden rate per hour, and printing on each card the resulting labor amount and the resulting burden amount, carrying an accumulating total of each, and posting the labor amount on the wage accrual record card, to prove the daily time clock card wage extension. Burden is extended only on the portion of the job order time cards where burden is applicable. This entire operation, for about 1,200 daily job order time cards, is done in about 6½ hours, or at the rate of 3 cards per minute. A proof tape is obtained from this operation to verify total premium amounts and totals of labor and burden, which are utilized as a check later in the cost of posting operations.

The third operation of summarizing the payroll produces three separate records at one operation; namely:

1. Statement of employees' earnings and deductions for insertion in the pay enevelope.
2. Ledger record of employees' earnings and deductions used for social security tax and other reports.
3. Weekly payroll summary showing all earnings and deductions and giving a complete history of the week's pay. (Illustrated in Figure 1.)

This operation consists of picking up the previous earnings to date (quarterly figure) from the ledger record of employees' earnings and adding the current wage. The machine extends the new earnings-to-date figure.

The current wage is retained in the machine. The Federal Old Age Pension and the Philadelphia City Tax are then calculated and deducted from the current wage. The possible range of pay and taxes to be withheld (corresponding to the wage bracket table provision of the Current Tax Payment Act of 1943) is imprinted at the top of each employee's earnings record. This eliminates the need for securing details of employee exemption and dependence status from clock card or other timekeeping media. Thus, to determine the amount of the deduction it is only necessary to select the bracket determined by the gross pay for the current week and read the amount of tax to be withheld. This current tax amount is entered, as well as War Bond and other miscellaneous deductions, and the net pay is mechanically computed and printed. The date is automatically printed and the workman's name, number, and number of weekly hours typed to complete the operation. At the completion of this operation for each payroll section, machine totals are obtained of Federal Old Age Benefit and City Tax, Withholding Tax, War Bonds and other miscellaneous deductions as well as of Net Pay and Current and To-Date Earnings. This complete operation for approximately 875 employees requires approximately 10 to 12 hours on one machine.

After summarizing the payroll, the week's daily job order time cards are sorted into product lines and then by order number. Taking one product at a time, the machine operator lists the amount of premium labor and burden from each card under a given order number, then machine posts the total of labor and burden to the cost ledger record. This is done for each order or account ledger card —the original order cost ledger card being a copy of the original production order with provisions made for account posting on the back. (See Figure 2.) In making this posting, the operator picks up the previous balances of labor, material and burden, and, as the machine postings are made, the current amounts of labor, material and burden are printed together with the new balance of each to date—thereby, at all times, keeping the cost ledger cards computed to date.

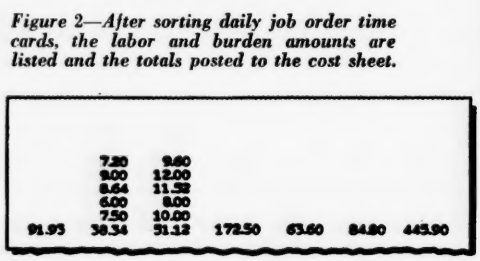
In the previous paragraph, we mentioned material postings. These machine postings are made, the current amounts of labor, material and burden are printed together with the new balance of each to date—thereby, at all times, keeping the cost ledger cards computed to date.

In the previous paragraph, we mentioned material postings. These originate from material requisitions which are posted separately in exactly the same manner as the job order time cards.

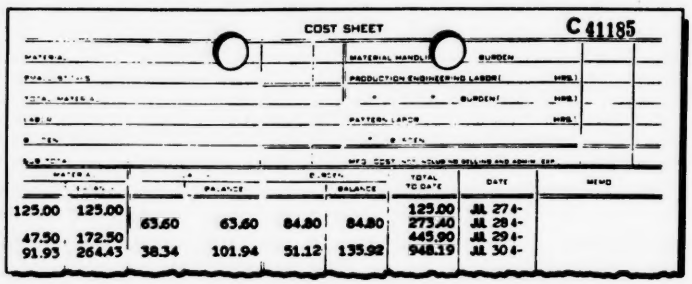
Under this new procedure, costs which were previously never known until the order was completed, are now available immediately, and the tedious task of posting the order by adding hundreds of cards, has been eliminated—the work being accomplished in shorter weekly postings with much greater ease. This procedure has eliminated the peak loads previously encountered at the end of the month and, at times, when several large orders were closed out simultaneously.

The two machines used in this work post a weekly total of approximately 7,000 daily job order time cards and 2,500 material requisitions to about 1,900 orders and accounts.

Figure 2—After sorting daily job order time cards, the labor and burden amounts are listed and the totals posted to the cost sheet.



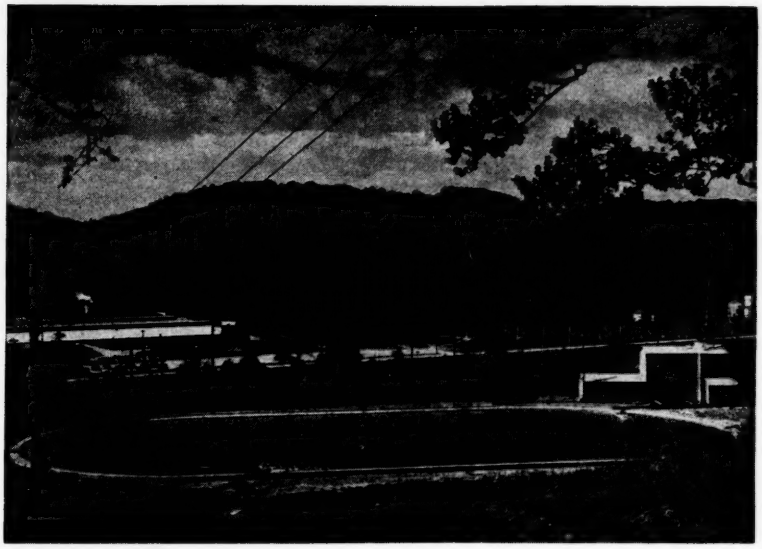
	7.20	9.60				
	9.00	12.00				
	8.64	11.52				
	6.00	8.00				
	7.50	10.00				
91.93	38.34	51.12	172.50	63.60	84.80	445.90



COST SHEET C 41185

		BALANCE		BALANCE		TOTAL TO DATE	DATE	MEMO
125.00	125.00					125.00	JL 27 4-	
		63.60	63.60	84.80	84.80	273.40	JL 28 4-	
47.50	172.50					445.90	JL 29 4-	
91.93	264.43	38.34	101.94	51.12	135.92	948.19	JL 30 4-	

Brine Wells Yielding Chlorine for War Effort



ONE of the largest chlorine plants ever built is now in operation at Natrium, W. Va. It is being run for the Defense Plant Corporation by the Pittsburgh Plate Glass Company's Columbia Chemical Division.

Completion of the big plant was carried out in schedule time by H. K. Ferguson Company, industrial engineers and builders of Cleveland and New York. Six buildings, all functional in design, were erected, some by use of second-hand steel frames.

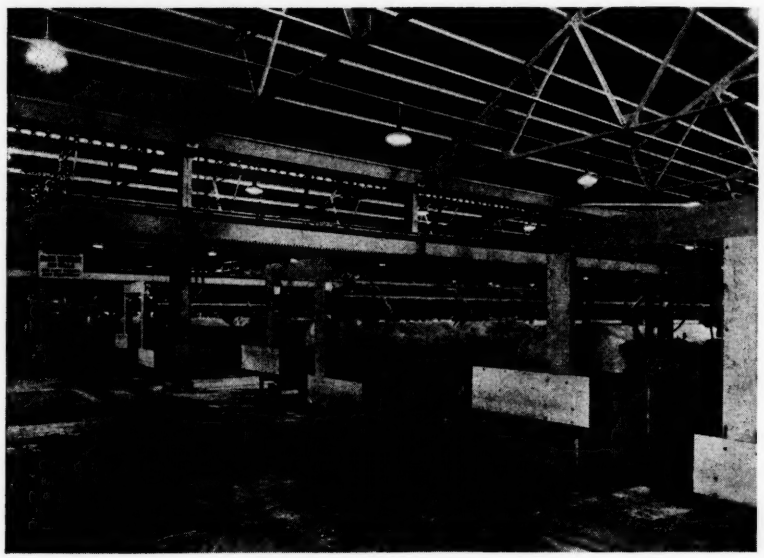
In addition to manufacturing liquid chlorine, an ingredient in hundreds of industrial operations, the plant also produces caustic soda as a co-product. While exact capacities were not announced, Ferguson engineers, who are specialists in chlorine plant construction, said the layout "was almost as large as the biggest ever built as a single unit," referring to the Las Vegas project built by them.

The new plant is located on the bank of the Ohio River, about 35 miles below Wheeling, adjacent to one of the richest salt veins in that area. The site was chosen by Pittsburgh Plate and Defense Plant Corporation officers because of the availability of salt, basic raw material, coal, and both water and rail transportation.

Manufacturing chlorine from salt brine—salt water—requires an electrolytic process employing miles of pipes, thousands of feet of electrical conduit, scores of tanks and hundreds of vat-like pieces of equipment called "cells." The problem is to isolate the chlorine from the salt, known chemically as "sodium chloride."

The process starts in a million-gallon pool, where salt brine is stored after being pumped from wells more than 6,000 feet deep—probably the deepest salt wells in the country; and the concentration is almost strong enough to support a human being floating in it. The brine flows from the pool to a series of brine treatment tanks in the main plant area about 750 yards distant, where impurities are removed before it enters the cells. In the cells, high amperage electrical current is passed through the liquid and a decomposition into chlorine gas, hydrogen gas, and sodium hydroxite (caustic soda) results.

From salt wells 6,000 feet deep brine is pumped into the million-gallon pool at Natrium, W. Va., shown above. One of four pump houses is seen at right. Below is interior of cell building, where high amperage current decomposes brine for recovery of war-essential chlorine.



The chlorine gas is piped to a "liquification" building, where it is cooled and dried by refrigeration. The finished product is liquid chlorine and it is piped directly into tank cars at a railroad siding next to the building.

The hydrogen gas can be caught and used in other processes at the plant site.

The sodium hydroxite (or "cell liquor") must be purified, and the caustic soda is often as valuable as the original chlorine. After leaving the cells, the liquor is sent to storage tanks, then to the caustic evaporator building where sodium hydroxide and unaffected salt are separated.

Industrial News

Knox Brothers Take Over Lombard Iron Works

P. S. Knox, Jr. and his brother, W. A. Knox, for many years successful lumber mill operators and contractors, with headquarters in Thomson, Georgia, are today operating one of the largest foundry and machine shops in the South, having taken over the Lombard Iron Works Company at Augusta.

Producing largely for War Industry, the plant is turning out large quantities of bearings, propeller shafts, rudders and deck equipment for the Navy and Maritime Commission. More than 500 workers are employed to do this work. Important additions have been made in equipment and personnel, in both the foundry and machine shops.

The Lombard Iron Works Company was founded in 1870 by George R. Lombard. Products from the plant are well known over many states.

The Knox organization was founded at Thomson nearly forty years ago and operates one of the largest lumber mills in the Southeast. The business (lumber mills) will be continued under the management of W. A. Knox, while P. S. Knox, Jr. will be in direct charge of the Lombard plant.

Freight Car Efficiency Gains

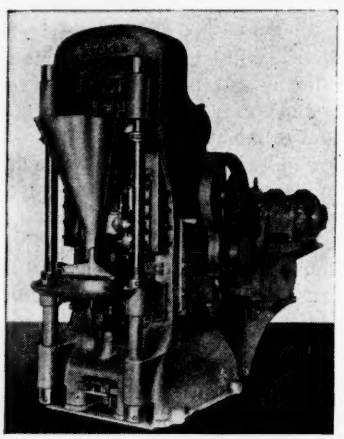
New efficiency records in freight car handling are being established almost daily under pressure of war shipment demands. The Association of American Railroads reports, through its Car Service Division, that although car loadings in the first eight months of 1943 were 778,000 lower than in the same period of 1942, the ton-miles increased 73 billion, or 18 per cent. Miles per car day averaged 51 in the first nine months of 1943, the highest average on record. The percentage of empty mileage also was reduced from the 1942 figure.

Corporate Name Changed

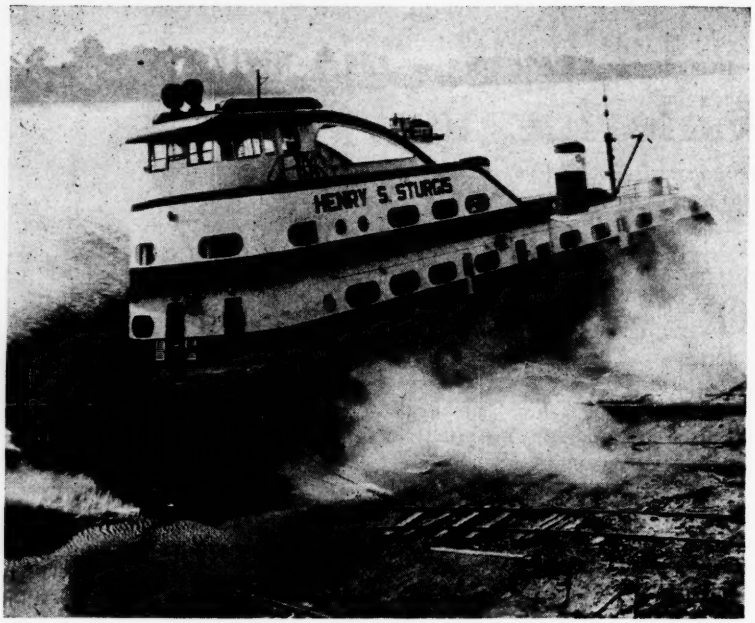
The West Virginia Rail Company of Huntington, West Virginia, announces the change of its corporate name to the West Virginia Steel and Manufacturing Company.

Norton Advances Three

William R. Moore has been made a vice president of Norton Company, Worcester, Mass. He will be in charge of national accounts. Ralph M. Johnson has been appointed the Company's general sales manager of grinding wheels and abrasive grain for the entire United States. He will make his headquarters at the Worcester plant but travel extensively. He has been Norton's Western Sales Manager since 1939. Succeeding him in the western region is W. Earle Shumway, whose territory will extend from just east of the Mississippi River to the west coast, including the Norton Detroit and Chicago warehouse districts.



Dehydrated food press



Ohio River towboat slides down the ways at St. Louis

St. Louis Shipbuilding Constructing Towboats

St. Louis Shipbuilding & Steel Co., operator of two St. Louis marine ways, is building six of 21 towboats for the Defense Plant Corporation. One of these, the Henry S. Sturgis, a product of its Davis Street yard, is pictured being launched. This vessel is now being operated by the Ohio River Co. on the wartime job of transporting coal to defense plants in the Chicago area. It was designed and constructed by the St. Louis company and is named in honor of the chairman of the board of the West Virginia Coal and Coke Co. Driven by two Fairbanks-Morse Diesel engines, totaling 1610 horsepower, the Sturgis is 154 feet long, 36 feet across the beam and has a draft of six feet, six inches.

Greene, Tweed & Co. Buys Asbestos Fibre

Two old-established firms were united with the purchase by Greene, Tweed & Co., of New York, of the Asbestos Fibre Spinning Co., of North Wales, Pa. The latter firm, established in 1898, has been principally engaged in manufacture of asbestos textiles such as yarns, cloth, rovings, tapes, packing, etc., and by the purchase Greene, Tweed & Co. will greatly enlarge its line and have an opportunity for further expansion. Greene, Tweed is well known for production of mechanical packings and various mill supply specialties.

New Press Makes Briquettes Of Dehydrated Foods

F. J. Stokes Machine Company, of Philadelphia, announces a special model of the Stokes No. 280 press, developed for handling a full range of granular and powdered dehydrated food products and making round, rectangular or specially-shaped briquettes at rates as high as 40 per minute.On most operations this machine is run at maximum production rates of from 30 to 40 strokes per minute. The machine is a modification of the Stokes press which is widely used in debulking chemicals, forming powdered metals, making plastics preforms and "dry-mix" ceramic specialties and similar operations. Many of these special models are now in use by food manufacturers in this country and abroad.

Construction Firm Assists Post War Planners

Assistance to communities in planning post-war work is offered by the Southeastern Construction Company of Charlotte, North Carolina, in counsel and furnishing approximate cost estimates. Southeastern comments that it "is glad to do its part in assisting planning authorities, even though it knows that such public construction jobs are let to the lowest bidder."

In an advertisement, the company describes and illustrates one of the local committee's major recommendations for post-war construction—a modern boulevard along now neglected Sugar Creek.

Earle Whitton is president of Southeastern, which has been a major war builder in seven southern states.

Engineer Co. Names Agents

W. D. Taulman and Associates of Atlanta have been appointed to represent the Engineer Company of New York in the Southeastern territory. The Atlanta firm consists of W. D. Taulman, Clem B. Edgar and W. J. Houston. A Jacksonville office is maintained with Cyrus L. Timmons in charge. The Engineer Company produces Enco baffle walls, burners and combustion control.

T. F. Scannell Promoted

Thomas F. Scannell has been appointed General Sales Manager of the Falk Corporation, Milwaukee, manufacturers of herringbone and helical gears, speed reducers, heavy drives, flexible couplings and steel castings. The appointment gives him supervision of foundry division products in addition to those he handled as Sales Manager. John S. Wilkinson, who has been connected with the Falk foundry in various capacities, has been made Assistant Sales Manager in charge of foundry sales.

Gerrard Co. Changes Name

The name of the Gerrard Company, Inc., a United States Steel Corporation Subsidiary, has been changed to Gerrard Steel Strapping Company, effective January 1, 1944. H. G. Walter, president, announced that the new name will not involve any change in the management or business, the principal reason being to identify the company more closely with its field.

Industrial News

U. S. Steel Tells of Vast Wartime Production

United States Steel Corporation subsidiaries have produced 60,000,000 tons of steel since Pearl Harbor, Irving S. Olds, Chairman of the Board of Directors, announces. The 2,000 new records broken included high marks in production of raw materials, manufacture of pig iron, steel ingots and finished products, and outstanding accomplishments in the construction of naval craft.

"United States Steel alone shipped more than 82,000,000 tons of ore from the Lake Superior district since December 7, 1941," Mr. Olds said. "For fire consecutive months in 1943 these shipments shattered all previous ore shipping records for comparable months."

Electrolytic tin plating lines, plus other facilities have saved more than 4,000,000 pounds of the nation's vital tin supply. U. S. Steel's metallurgists also joined in developing National Emergency steels, to produce high quality results but use much less of such alloys as nickel and chromium.

Mr. Olds disclosed that nearly 100,000 employees have entered the armed services and that to replace them and man new facilities U. S. Steel has trained approximately 200,000 new employees. Today 37,056 women are employed by the corporation, a large portion of them in mill jobs formerly held by men.

Among outstanding shipbuilding accomplishments, Mr. Olds pointed out that U. S. Steel's shipyard at Kearny, N. J., holds all world's speed records for building destroyers and that its new Port Newark, N. J., yard, constructed in record-breaking time since Pearl Harbor, is now delivering a destroyer escort every five days. Ships being built for the Navy include destroyers, giant troop transports, cruisers, destroyer escorts, cargo ships, infantry and tank landing craft, tankers, and cargo combat ships. U. S. Steel's inland shipyards on the Ohio River in October delivered to the Navy more LST's (Landing Ships for Tanks) than any other inland yard.

To meet war-time demands, U. S. Steel embarked upon an $811,000,000 expansion program. U. S. Steel funds for this program amounted to $330,000,000, with the government financing the remainder.

Higgins Heads Pittsburgh Glass

The Board of Directors of the Pittsburgh Plate Glass Company has approved the following changes in executive personnel, to become effective as of January 1, 1944: Clarence M. Brown has resigned as chairman of the board of directors, but will remain active on the executive committee, on the board, and as chairman of the finance committee. Harry S. Wherrett, now vice chairman, will become chairman of the board, Robert L. Clause, now president, will become vice chairman of the board, and Harry B. Higgins, now executive vice president, will become president.

More Building Steel in 1944

It appears likely that construction steel will be released in increasing quantities in 1944 and the postwar period for much needed industrial and commercial building, in the opinion of Robert T. Brooks, executive vice president of the American Institute of Steel Construction. He points to the fact that he nation's war manufacturing plant was virtually completed early in 1943, and that the steel construction industry "then promptly adapted itself to manufacture of a long list of heavy war materials." This work continues, and will be a governing factor in how much construction steel can be released in the new year.

Silver Made Available

Treasury silver made available to essential industry under the Green Act is being purchased in substantial volume for the production of engine bearings, brazing alloys and solders, and "official articles," it was disclosed at the last meeting of the Silver Producers and Distributors Industry Advisory Committee. Purchase authorizations totaling some 25,000,000 ounces have been issued to date by WPB.

"Piston Packin' Mammas"

Women in men's jobs are common enough right now, but Mack Trucks, Inc., claims a girl team believed to be unique—the only female Diesel mechanics in the country. They work together as shown here, putting the finishing touches on a Diesel engine installed in a 10-ton army prime mover at the Mack factory in Long Island City, N. Y. The other mechanics, all male, call them their "Piston Packin' Mammas." They are Amelia Balacich, left, and Evelyn Beers.

New Oil Official Named

William M. Averill, of Corpus Christi, Texas, has been appointed director-in-charge of District 3 (Southwest) of the Petroleum Administration for War. He succeeds D. E. Buchanan, who resigned to return to his post as vice-president of Hanlon-Buchanan, Inc., of Tulsa, Okla. (PAW District 3 includes Texas, Louisiana, New Mexico, Mississippi, Alabama and Arkansas.)

100-Octane Not True Gas

Wartime 100-octane aviation gasoline is not what was called 100-octane gasoline before Pearl Harbor, nor is it gasoline in the true sense.

So great has been the improvement in the product in the last two years that pursuit planes are able to take off in less distance, fly faster, climb faster, and reach a higher ceiling with the present fuel than with the 100-octane that was considered the "perfect" fuel prior to 1942. Bombers can carry a greater load than with pre-war 100-octane.

The prime advantage of the improved fuel is that it gives the pilot more power in critical situations when maximum power is most needed. To obtain this added power, only minor adjustments are required on engines now in use, but originally designed to use pre-war 100-octane.

Though still called gasoline for convenience, 100-octane is not gasoline in the ordinary sense, but is superfuel produced by rearranging the petroleum hydrocarbon molecules through use of catalysts.

Century Official Elected

R. J. Russell, Vice-President and sales manager of the Century Electric Co., St. Louis, has been elected President of the Associated Industries of Missouri.

Civilian Needs Surveyed

A nationwide survey to determine the most serious shortages of civilian goods is being conducted by the Office of Civilian Requirements, with the promise that the results will go a long way in determining OCR policy in 1944. Results will be made known in a series of reports.

Southern Yards Turn Out 63 More Vessels

Sixty-three vessels built by southern yards in November helped the American shipbuilding industry exceed the president's directive for 24,000,000 deadweight tons of merchant shipping during 1942-43. At the end of that month 25,284,387 tons had been produced. Of the 101 other vessels in the November tally, most were built on the Pacific Coast. Southern production for the month:

Alabama Dry Dock & Shipbuilding Company, Mobile: 3 tankers.

Bethlehem-Fairfield Shipyard, Inc., Fairfield, Md.: 20 Libertys.

Bethlehem-Sparrows Point Shipyard, Inc., Sparrows Point, Md.: 3 tankers.

Delta Shipbuilding Company, Inc., New Orleans: 6 ET1 tankers.

Gulf Shipbuilding Corporation, Mobile: 2 C-2 cargoes.

Houston Shipbuilding Corporation, Houston: 7 Libertys.

Ingalls Shipbuilding Corporation, Pascagoula, Miss.: 2 C-3 cargoes.

J. A. Jones Construction Company, Inc., Brunswick, Ga.: 4 Libertys.

J. A. Jones Construction Company, Inc., Panama City, Fla.: 2 tank carriers.

McCloskey & Company, Tampa: 1 C-1 cargo.

Pendleton Shipyards Company, Inc., New Orleans: 1 seagoing tug.

Pennsylvania Shipyard, Inc., Beaumont, Texas: 2 C-1 cargoes.

San Jacinto Shipbuilders, Inc., Houston: 1 concrete barge.

St. John's River Shipbuilding Company, Jacksonville: 4 Libertys.

Southeastern Shipbuilding Corporation, Savannah: 4 Libertys.

Welding Shipyards, Inc., Norfolk: 1 tanker.

American Car Changes

Allen W. Clarke, an authority on passenger car building, has been made Assistant General Mechanical Engineer of the American Car and Foundry Company, and will have headquarters at St. Charles, Mo. Mr. Clarke is holder of a number of patents, and during the last war designed field kitchens for the United States Army.

Dudley L. O'Brien, a native of Washington, D. C., who began his work with the American Car and Foundry Company at the Huntington, West Virginia, plant in 1919, has been appointed District Sales Manager of the Cleveland office. He succeeds R. A. Williams, who has been transferred to the New York general offices

Bendix-Weiss Joints in War

Enough of the new Bendix-Weiss "constant velocity" universal joints to equip nearly half a million United Nations multiple-drive vehicles have been produced at South Bend, Ind., by Bendix Aviation Corporation since Pearl Harbor, Ernest R. Breech, company president has revealed. The new device is now transmitting the rolling power for the famous Willys-built jeep, Army half-track trucks and in fact 3 out of 4 of all the multiple-drive vehicles serving the military transport needs of America and her Allies on every world battlefront, Breech said. Reports from every battlefront from the Mediterranean area to New Guinea show virtually a 100 per cent performance record for Bendix-Weiss joints under the most rigorous combat conditions, it was stated by D. E. Rice, assistant sales manager of Bendix Products division. The Bendix-Weiss universal joint, embodying basically new principles, with important practical advantages, including "constant angular velocity" of the driven member and elimination of sliding splines is the culmination of 10 years of research and tests, Rice said. It was perfected by the corporation engineers before America entered the war, he stated.

Nylon for Civilian Use

Between 1,000,000 and 1,500,000 yards of parachute nylon cloth rejects and seconds have been released by the War Production Board for unrestricted civilian use.

The nylon fabric, which is in addition to approximately 600,000 yards released last September 22, is in the hands of more than 70 Army contractors, but could not be disposed of by them without WPB permission. The release of the nylon fabric covers yardage in all lengths. It is emphasized that the material is in woven form and is completely unsuitable for the manufacture of hosiery.

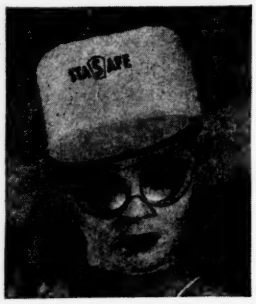
Industrial News

More Plants Make Tire Cord

The United States Rubber Company has reconverted two more of its textile mills from the manufacture of duck to tire cord production, it is announced by H. Gordon Smith, general manager of the rubber company's textile division.

These mills are located at New Bedford, Mass., and Shelbyville, Tenn., respectively, and make a total of four mills operated by the company, including one at Hogansville, Ga. and another at Winnsboro, S. C., now devoted to tire cord production. This is in line with the government's program for more rayon and cotton tire cord for both military and essential civilian transportation needs.

Up to now, the New Bedford mill has been producing some numbered duck used in making gas mask carriers, jungle boots, leggings, bed rolls, tents, and other war items for the Army Quartermaster Corps. This production has now been diverted to the manufacture of tire cord. Chafer fabric, which is also an important item in the manufacture of tires, will continue to be made at Shelbyville to the extent of about 25 per cent of the plant's capacity. The balance of 75 per cent, involving the manufacture of numbered duck, has been converted to tire cord production. The United States Rubber Company's Reid Mill, also located at Hogansville, Ga., will continue to make hose and belt duck for war orders.



Ventilated Mask Developed

Extra ventilation for workers on unusually hot jobs is provided in a new perforated all-plastic eye mask developed by the Standard Safety Equipment Company of Chicago. The company also announces a new Sta-Safe model hairguard for women industrial workers. It resembles French Foreign Legion headgear and is designed to cover and protect all the worker's hair.

Branch Managers Named

H. J. Renken has been made Branch House Manager of Fairbanks, Morse & Company's Dallas branch. He will continue to serve also in his capacity as Manager of the Oil Field Division. G. N. Van Epps, former Manager of the Diesel Department, Chicago, has been promoted to Manager of the firm's Atlanta Branch.

Building Drop Frees 500,000

The current decline in construction released about half a million men for other employment by the end of 1943, the War Manpower Commission estimated.

Since the wartime peak of 2,190,000 men in the fall of 1942, construction employment has fallen steadily until it reached about 1,066,000 in the same period of this year. Labor market information indicates that the decline will continue to about 500,000 or 600,000 in July, 1944.

Between July and November of this year more than half of 267,000 construction workers released were in areas of acute labor shortages, thereby facilitating their rapid reabsorption into industry. In areas where the labor supply is adequate the War Manpower Commission is recruiting displaced construction workers for transfer.

Hendrix to Assist OPA

B. L. Hendrix, South Carolina lumberman of more than 30 years' logging and lumbering experience, has been appointed consultant in the Office of the Director of the Industrial Materials Price Division, Office of Price Administration. Mr. Hendrix is owner and operator of The Hendrix Mill and Lumber Company, of Estill, S. C., 50 miles north of Savannah.

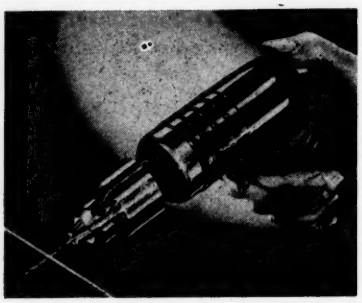
Acid Wastes Eliminated

A program to eliminate discharge of industrial wastes into the nearby Shenandoah River has been perfected by the chemical and engineering staffs of the American Viscose Corporation's Front Royal, Va., plant. By means of special equipment all wastes from the plant are so treated and neutralized that the water, according to Dr. Warren L. Moody, of the Virginia Commission of Game and Inland Fisheries, is "just about neutral or normal."

An important factor in the program has been the installation of acid recovery equipment, which prevents the escape of concentrated acids to the river. A large biological filter which neutralizes the high sulphite containing liquids has also been placed in operation. In addition there are three 100 by 300 foot retention or settling basins in which all waste liquids from the plant are retained for long periods of time. Treatments are applied and finally the purified waters are allowed to flow into the river. The cost of the waste disposal program has been approximately $250,000.

Daniel C. Mills Advances

Daniel C. Mills has been appointed manager of Industrial Relations, Bethlehem Steel Company, it was announced today by J. M. Larkin, Vice President in charge of industrial and public relations for the company. He succeeds the late G. W. Vary. Upon entering Bethlehem employ, Mr. Mills took the loop course on the completion of which he was assigned to the Sparrows Point Plant at Baltimore, where he held in the order named the position of assistant master mechanic of the rail mills, general foreman of construction and plant steam engineer. In 1939 he was transferred to the general office at Bethlehem.



Plastic Housing for Drills

Lightweight Tenite plastic housings on rotary pneumatic drills enable women employees to handle man-size drilling jobs with accuracy and a minimum of fatigue. A natural-fit grip and smooth contours, as well as the decreased weight, make the drill comfortable to handle for continuous working. Hard blows on the housing are not likely to damage the operating parts of the drill, and the housings do not chip. The drill housings are molded by Reynolds Spring Company, Molded Plastics Division, Cambridge, Ohio, for Aro Equipment Corporation, Bryan, Ohio. Tenite is a product of Tennessee Eastman Corporation, Kingsport, Tennessee.

Mobile Yard Optimistic

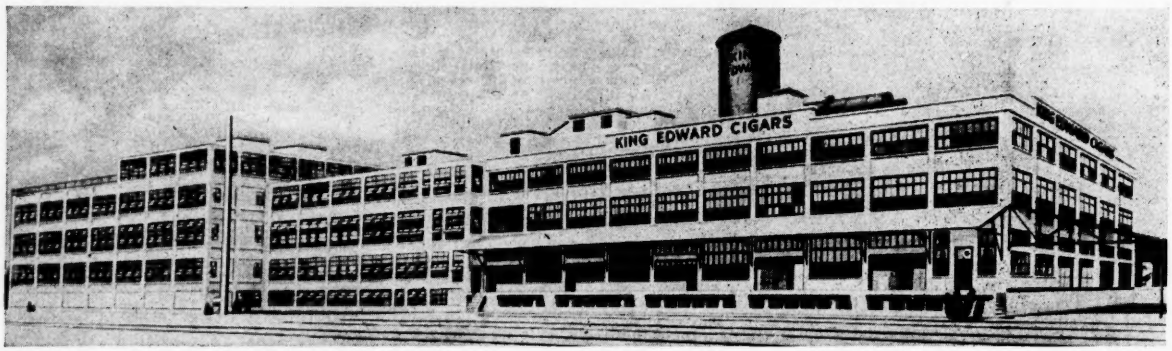
Confidence that the Mobile yard of the Alabama Dry Dock and Shipbuilding Company will compete successfully in "the tough market" that will exist after the war was expressed by F. B. Spencer, Vice President and General Manager. His remarks were made at the launching of the S. S. Skull Bar, 22,400-ton tanker, first vessel started under his management.

200,000 in Light Metals

Employment in the aluminum and magnesium industries has grown from 30,000 in 1939 to 200,000 in 1943, according to Arthur H. Bunker, director of this field in the War Production Board. He reports that aluminum supplies for the fourth quarter of 1943 were 871,200,000 pounds, almost 100,000,000 pounds in excess of requirements. In the four-year period production of domestic bauxite has risen 1,200 per cent; aluminum tubing 1,300; aluminum sheets 700; aluminum rod and wire 1,200; extruded shapes, 1,000; and aluminum forgings 4,500.

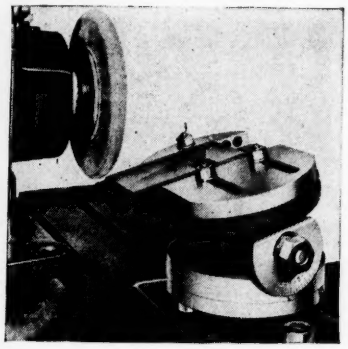
Erb Goes with Worthington

Worthington Pump and Machinery Corp. announces that Harry A. Erb has joined its organization as service manager of the Moore steam turbine division, Wellsville, N. Y. A 1928 graduate of Cornell University, his experience covers the servicing of steam turbines, electric generators and all related equipment.



The largest cigar factory under one roof in the world is shown above. It is the home of King Edward Clagrs at Jacksonville, Fla., and it produces nearly 10 per cent of all cigars smoked in the United States. On the top floor is the famous King Edward Industrial Nursery, which was installed at a cost of $50,000 to care for children of the factory's workers.

Industrial News



New Chaser Grinding Fixture

A new universal chaser grinding fixture has been introduced by the Oster Manufacturing Co. of Cleveland, manufacturers of pipe and bolt threading machines, an improved simplified turret lathe, and a torch cutting machine for pipe welders. The new chaser grinding fixture is designed for easy mounting on the table of any conventional tool and cutter grinding machine and is adjustable for any throat or rake angle desired. Accurate grinding by the new fixture saves costs of replacing dies and chasers which are often ruined either from lack of proper grinding or from too long use between grinds.

Bemis Bag Wins Honor

Bemis Brothers Bag Company has been honored by the American Chemical Society for its new multi-walled waterproof bag with Aquatex closure, displayed recently at the Chemical Industries Exposition in New York. The Society's citation says: "This bag, used for overseas shipment of food and chemicals, has been submerged in water for 24 hours. Fabricized entirely from wet-strength paper, moisture has not penetrated beyond the outer-laminated ply." The diversity of chemicals used in its construction was shown by a display of numerous bottled ingredients.

Telephone Service to Curacao

Telephone service from the United States has been extended to the island of Curacao in the Dutch West Indies over a short wave radiotelephone channel linking in stations of the American Telephone and Telegraph Company. The rate for a three-minute conversation between the eastern United States and Curacao will be $12 on weekdays and $9 on Sundays. Curacao is an important oil refinery center. All the most important islands in the Caribbean area are now within reach of Bell System telephones.

Export Freight Up 76%

There were 133,537 cars of export freight, excluding coal and grain, handled through United States ports in November compared with 75,767 cars in November last year, or an increase of 76 per cent, according to reports just compiled by the Manager of Port Traffic of the Association of American Railroads and made public today. Export grain unloaded at the ports totaled 4,772, compared with 3,259 in November, 1942, or an increase of 46 per cent.

Myers War Policy

F. E. Myers & Brothers Co., Ashland, Ohio, manufacturers of pumps and water systems have announced that while their line has been shortened because of war needs, dealers will be supplied with suitable equipment for all standard conditions. Myers' salesmen will have charge of administering the program as was explained at a special meeting held at Ashland, Ohio. Salesmen's knowledge of territory needs for food production accounts for the adoption of this wise course.

Spanish Moss Goes to Work

Gathering of Spanish moss, the stringy growth which festoons so many trees in the South, has become a profitable if unusual business because of demand for the fibre for stuffing upholstery. The output in Louisiana has been estimated by the Wall Street Journal at $750,000 annually with supplementary production in Florida and South Carolina making a $1,000,000 total.

Gathered in the early fall, the moss is subjected to an eight-months curing process by being left in pits four feet deep. Proper regulation of the "pitting" is important, since it determines the quality and commercial grade of the product, which should be a dark, dry, unfermented inner fibre free from bark, leaves and refuse.

When ready for the furniture or mattress maker, the moss is baled and wrapped in burlap, and either shipped direct to factories or sold through local dealers.

New Kennametal File

Kennametal Inc., Latrobe, Pennsylvania, is now marketing, a new and revolutionary type of file made of the same hard, high strength cemented carbide compositions as the steel-cutting Kennametal lathe and boring tools.

Extended service trials have demonstrated that the new file will permit filing speeds of 3 to 10 times that possible with steel files, and outlast them 50 to 200 times. It will cut steels of a hardness up to 62 Rockwell C, which the ordinary file will not touch, and does a noteworthy job on cast iron and brass at surface speeds around 900 feet per minute. High-carbon, high-chromium steels have been filed at 800 s.f.m., with the files still in good condition after three weeks of use, compared to steel files lasting only one day on this work.

Link-Belt Elects

W. C. Carter, president of Link-Belt Company, Chicago, announces the election of two vice-presidents, effective January 1. E. L. Berry, vice-president and general manager of Link-Belt Ordnance Company, has been elected vice-president of Link-Belt Company, the parent organization.

Richard F. Bergmann, company chief engineer, has been elected a vice-president of Link-Belt Company, with headquarters at Chicago, as heretofore. John E. Martin has been appointed manager of Link-Belt Ordnance Co., with headquarters at the plant.

Griffin Distribution Points

Griffin products will be distributed henceforth from two warehouses as follows: Southern District — Griffin Engineering Corp., 633 N. Myrtle Ave., Jacksonville 4, Fla. Midwest District—Griffin Engineering Corp., 548 Indiana St., Hammond, Ind. Griffin Wellpoint Corp., manufactures systems for dewatering and water supply, high pressure jetting pumps, portable fire pumps and oil pumping equipment. Its associate, Griffin Equipment & Supply Corp., makes gasoline and Diesel engine-driven generator sets, lighting plants, portable floodlighting equipment, and marine auxiliary sets.

Anti-Inflation Program Launched by Koppers

An advertising campaign directed against inflation, and including free factory poster distribution, is being launched by the Koppers Company, Pittsburgh. The poster is illustrated and offered in single pages scheduled for magazines covering the fields of management and heavy production industry. Under the caption, "Only folks like YOU and me can prevent this," the poster shows a shabbily dressed mother and small daughter standing in a snowstorm before a brightly lighted store window where shoes are displayed with the marking, "$50.00 Pair." The poster's bottom copy says, "The trouble is that everyone thinks it's all right to hold down the other fellow's wages and prices, but not HIS." The only institutional feature of the offering ad is the inclusion of the Koppers tag-line, "The industry that serves all industry." Ketchum, MacLeod and Grove Inc., is the agency, and Vincent Drayne the account executive.

York Manager Wins Award

The Wolverine award for the year's most outstanding technical paper on refrigeration was presented to John G. Bergdoll, General Works Manager of the York Corporation, at the 39th Annual Meeting of the American Society of Refrigerating Engineers held in Philadelphia. Mr. Bergdoll was given the award for his study of the engineering problems involved in creating high altitude weather inside the new stratosphere test chamber, first developed in the York research laboratories in 1939. He has helped in the development and production of more than 35 strato-chambers now at work testing pilots and aviation equipment. The chambers duplicate conditions found as high as nine miles above the earth where temperature drops to 70 below zero and air pressure approaches that of a near vacuum.

All-Steel Cars for 1944

Thirty thousand all-steel freight cars will be produced in 1944, the War Production Board announces. Available supplies of steel and a shortage of lumber are responsible for the decision. To the 30,000 units of the all-steel "Victory design" will be added about 20,000 of the steel-and-wood composite model, for a total production of 50,000.

Veterans Help Build Ships

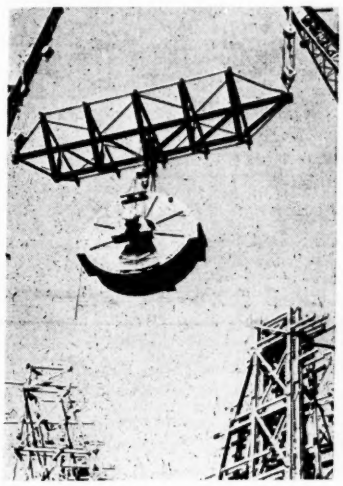
Houston Shipbuilding Corporation's yard at Houston numbers more than 200 employes honorably discharged from the Army, Navy or Marine Corps. Many of the men have been wounded in action and wear the Order of the Purple Heart. "These men are among our best workers—they've been through it," says the yard's personnel director.

New Metal Marking Ink

Handling and efficiency in production has caused a great increase in the stencilling of metal containers, bombs, airplane parts, shipbuilding parts and other articles being manufactured in the war effort. As a result, a metal marking ink bearing the trade name Brit-Mark-Ink has been developed by the Diagraph-Bradley Stencil Machine Corp., St. Louis. The fluid is non-settling and non-clogging, and comes in government colors or special colors of the user's order. It meets U. S. Government requirements in resistance to light, salt water, etc.

900,000 Horsepower for Tankers

Among the largest electric marine motors ever built are those which General Electric is producing to power the oil tankers slipping off American ways. These develop as high as 10,000 horsepower each, and during 1943 G. E. produced them to an aggregate of 900,000 horsepower for tankers alone.



10,000-HP tanker motor

Southern Industrial Expansion during December

ALABAMA

BIRMINGHAM — H. K. Ferguson Co., Cleveland, Ohio, has contract for erection of plant for Ferro Enamel Co., 4150 East 56th St., Cleveland, Ohio.

JEFFERSON COUNTY — Defense Plant Corp., executed contract with Republic Steel Corp., Cleveland, Ohio, to provide plant facilities in Jefferson County, Ala.; $125,000.

GADSDEN — J. F. Oliver, Birmingham, Ala., has contract for excavation and grading of the main section of Goodyear Plant; George A. Fuller Co., 597 Madison Avenue, New York, contractor for the 256,000 sq. ft. addition to the plant; involves an expenditure of $30,000,000; Robert and Company, Atlanta, Architects.

BIRMINGHAM—Ferro Enamel Co., Cleveland, Ohio, and Birmingham, reported, erect plant cost $200,000 in Birmingham.

FLORIDA

OLIVE—Hardway Contracting Co., Columbus, Ga., has contract for steam generating plant for Gulf Power Co., Pensacola.

GEORGIA

ATLANTA—Round-House Addition—Bids opened December 23, for construction of additions to shops in Atlanta; Seaboard Air Line Railway Co.

SAVANNAH — Central Georgia Railway Co., authorized to spend $2,761,326 on rehabilitation and improvements in 1944, including new rails, road improvement and new equipment.

KENTUCKY

BULLITT COUNTY — plant — Defense Plant Corp., increased contract with George T. Stagg Co., New York, N. Y., for funds to provide machinery and equipment at a plant in Bullitt County; $140,000.

MARION COUNTY — plant — Defense Plant Corp., increased contract with Associated Kentucky Distilleries Co., New York, N. Y., for funds to provide additional facilities at plant; $150,000.

MARYLAND

BALTIMORE — Baltimore & Ohio R. R. Co., issued a request for bids on $3,097,000 principal amount of equipment trust certificates, Series M; proceeds from the sale will be used in acquisition of three Diesel freight locomotives of 5,400 h. p. each to be built by Electromotive division of General Motors Corp.; 15 Diesel switchers of 1000 h. p. each, of which Baldwin Locomotive Works will build 8 and American Locomotive Co., 7; one 500 h. p. Diesel switcher to be built by General Electric Co.; 20 Mallet freight engines built by Baldwin and 965 hopper cars by Bethlehem Steel Co.; aggregate cost of all equipment will be not less than $10,780,000.

BALTIMORE—Defense Plant Corp., increased contract with General Motors Corp. to provide additional equipment to Baltimore, Maryland, Mercer County, N. J., and Westchester County, N. Y., plants, to cost approximately $275,000; (increase in contract) resulting in an over-all commitment of approximately $11,100,000.

ELKTON—Consolidated Engineering Co., Baltimore, has contract for T. N. T. Consolidating Area, for Triumph Explosives, Inc.; Whitman, Requardt & Smith, Archt. Engrs.

CUMBERLAND—J. F. Omps, President of the Buck Valley Canning Co., plans construction of a packing house with equipment to accommodate the canning of 12,000,000 cans of tomatoes; purchased canning machinery from various Eastern Shore and Delaware canneries.

BALTIMORE COUNTY — Defense Plant Corp., Washington, D. C., granted $20,000 to Park & Tilford Distillers, Inc., New York, N. Y., to provide facilities at plant, in Baltimore County.

SPARROWS POINT—Morrow Bros., Inc., 14 E. Eager St., Baltimore, has contract for service building extension for Bethlehem Steel Co.; struc. steel and brick; 2-story.

BALTIMORE — Cummins Construction Corp., 803 Cathedral St., has contract for 2-bay extension to crane runway, tunnel, etc., 1001 Edison Highway, for Rustless Iron & Steel Co.; cost $25,000.

ELKTON—Consolidated Engineering Co., 20 E. Franklin St., Baltimore, low bidder for building for Triumph Explosives, Inc.; Whitman, Requardt & Smith, Archts. and Engrs., 1304 St. Paul St., Baltimore.

BALTIMORE—Davis Construction Co., 9 W. Chase St., has contract for premix and storage building, 5601 Eastern Ave., for Pemco Corp., cost $14,000.

FAIRFIELD — Irwin & Leighton, Inc., 1505 Race St., Philadelphia, Pa., has contract for machine shop addition for Bethlehem-Fairfield Shipyard, Inc.; 1-story; frame; cost $75,000.

BALTIMORE — Maryland Wiping Cloth Co., will construct 2 buildings at 1810 Worcester St.; Porter T. Bond, 618 E. 34th St., Archt.; owner builds.

MISSOURI

MALDEN — E. A. Brunson Construction Co., 4052 Forest Park Blvd., St. Louis, low bidder for ice storage building, for Malden Ice & Fuel Co.

ST. LOUIS — Trustees of St. Louis-San Francisco Railway, granted authority by Federal Judge George H. Moore, to expend $5,845,429, for improvements to roadway and equipment in 1944.

ST. LOUIS—Trustees for St. Louis-San Francisco Railway, petitioned United States District Judge George H. Moore for authority to spend $2,483,162 during 1944 for additions and betterments to the road and to subsidiary lines; expenditures of $2,380,224 on Frisco lines to include $844,869 to construct 4.12 miles of new main track from Gasconade River Bridge to Franks, Mo.; $75,432 on Kansas City, Fort Scott & Memphis Railway, and $27,506 on Kansas City, Memphis & Birmingham Railroad.

ST. LOUIS COUNTY — Hamilton Engineering Co., Chicago, Ill., awarded contract by Defense Plant Corp., of $120,000 to provide equipment for plant in St. Louis County .

ST. LOUIS — Defense Plant Corporation authorized an operation contract to the National Magnesium Casting Co., of St. Louis; plans for construction of a $400,000 magnesium casting plant, to produce light-weight airplane and turret parts for the Army Air Corps; operation by March: National Magnesium Company has been organized by William L. Heckmann, 8025 S. Broadway; some of the equipment contracts have been let.

ST. LOUIS—Wendell Shasserre, 5956 Wells Ave, has contract for repairs to plant and office, 3912 Easton Ave. for Chapman Ice Cream Co.; cost $20,000; Ernest T. Friton, Archt., Security Bldg.

NORTH CAROLINA

DURHAM—Standard Oil Co., of New Jersey, seeking permission to install oil pipe line between Durham and Greensboro, also requested permission to expand its storage facilities in Durham by installation of an additional 500,000 gal. tank on firm's property, located between Angier Ave. and Southern Railway Co.'s right of way.

CHARLOTTE—shop—Carolina Truck & Trailer Co., let contract to McDevitt & Street for construction of a new $15,000 shop building.

ENKA — American Enka Corp., textiles, let contract to Merchant Construction Co., 290 Biltmore Avenue, Asheville, for extensions to research building and spinning bath.

OKLAHOMA

MIAMI—B. F. Goodrich Co., Akron, Ohio, plans construction of synthetic tire manufacturing plant; work to start soon.

SOUTH CAROLINA

ORANGEBURG — Southeastern Construction Co., Charlotte, N. C., has contract at $30,424 for expansion program No. 4, one building and three additions to Hawthorne School of Aeronautics; Harold C. Tatum, Charleston, Architect.

CHARLESTON—Columbia — South Carolina Public Service (Santee-Cooper) authority, R. M. Jefferies, Charleston announced plans for an expenditure of $500,000 in ten projects and development of a deep-water channel from Charleston to Columbia. The latter will be a post-war project, entailing construction of dam at the confluence of the Congaree and Wateree River near Buckingham Landing; will provide slack water navigation from the dam-site to Columbia; estimated cost $30,000,000. Projects which would be completed and their costs during the next six months are listed as: rehabilitation of electrical distribution facilities in the Horry divisions including Myrtle Beach, Moncks Corner, and St. Stephens, cost about $80,000; housing facilities for operators of plants in Berkeley county and other centers of power operation, cost $75,000; office buildings at plant site and in vicinity, cost $100,000; improvement of grounds at Santee and Pinopolis dams, cost $10,000; improvement of transmission lines already owned and construction of a line to St. George and Improvement of lighting shields, cost $15,000; removal of floatage, continued work on dams and dikes, malarial control and improvement of navigation conditions, cost for six months $125,000; reworking defects which have developed in porous concrete on dams and dykes, cost $25,000; sodding and slope protection on dams and dykes in spring, $25,000; establishment of severance lines between Santee-Cooper property and privately owned property, about 420 miles of lines to be marked at a cost of about $10,000.

TENNESSEE

KNOXVILLE — Smoky Mountain Trailways, acquired building at 415 West Main Ave., and will operate new bus terminal.

JACKSON — John McDonald, has contract for construction of factory building, on Rosedale Ave.; Ford Mfg. Co., c/o Mgr., owner; $10,000 estimated cost.

TEXAS

HARLINGEN — Food Machinery Corp., Valley Division, c/o E. M. Crockett, purchased site consisting of 32 acres, large enough to allow for expansion in the future; adjacent to the Missouri Pacific Railroad tracks, near Fairpark; building to be of brick or reinforced concrete frame; trussed roof construction; to be built in four sections; ultimate size, 120x630 feet; Bartlett Cocke, Milam Bldg., San Antonio, Archt.; W. E. Simpson Co., Milam Bldg., San Antonio, Texas.

BRAZORIA COUNTY — Defense Plant Corp., increased plant contract of the J. S. Abercrombie and Harrison Oil Companies of Houston, $4,000,000; funds will be used for plant expansion.

LUFKIN — Lufkin Foundry & Machine Co., W. C. Trout, Pres.-Mgr. plans construction of an engine assembly plant and new foundry and supply building.

McALLEN — Marshall Canning Co., soon let contract for 1-story, brick and rein. conc. construction processing plant expansion; cost $16,000.

NUECES COUNTY — Defense Plant Corporation, increased its contract with American Cyanamid & Chemical Corporation, New York, at $190,000, for additional equipment at a plant.

(*Continued on page* 74)

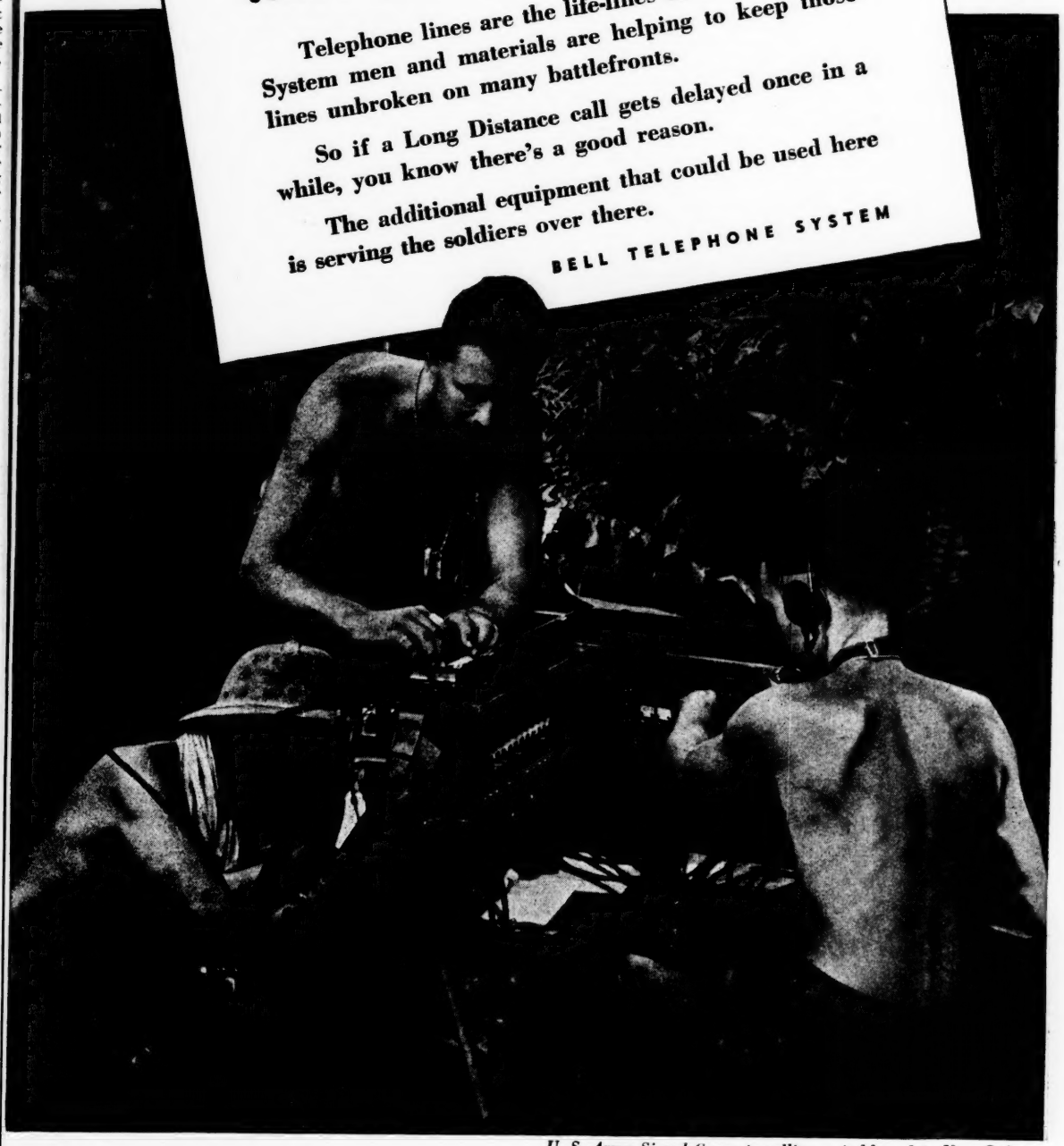
Your Long Distance call may have gone to New Guinea

Telephone lines are the life-lines of an army. Bell System men and materials are helping to keep those lines unbroken on many battlefronts.

So if a Long Distance call gets delayed once in a while, you know there's a good reason.

The additional equipment that could be used here is serving the soldiers over there.

BELL TELEPHONE SYSTEM



U. S. Army Signal Corps installing switchboard in New Guinea

WAR NEEDS THE WIRES

If the Long Distance circuit you want is busy—and your call isn't really urgent — it will help if you will cancel it.

If it must go through, we'll appreciate your co-operation when the operator says: "Please limit your call to 5 minutes."

Growing Cotton in Water Tanks

It's being done to develop new field methods

In this laboratory greenhouse, cotton can be "fed" as regularly and carefully as an infant.

COTTON has joined the long list of plants which have grown and thrived spectacularly in tanks of chemically treated water instead of in the soil. This system of water-culture, styled *hydroponics* by its originator, Dr. W. P. Gericke of Berkeley, California, has resulted in quick, giant growth of several fruit and vegetable crops and has been put into commercial operation to a limited extent.

The cotton experiments, however, do not look toward transferring cotton culture from fields to tanks. The system has been adopted by the Goodyear Tire & Rubber Company only as a means of closely studying development of different cotton strains, particularly the effect on the plants of various methods of fertilization. The research is being carried on in a greenhouse at Barberton, Ohio, and the company says that out of it "may come a revolution in the methods of growing cotton."

The company is interested in developing a superior fibre for automobile tires, but the program is fundamental in the assistance it is designed to pass along to growers.

Most spectacular result to date has been the introduction into Arizona of a strain of cotton known as the "Wilds 9" but which was previously well known in other cotton growing states. By the end of 1942, more than 2,000 acres of it had been planted in Arizona and this has been increased recently. The U. S. Department of Agriculture recently issued a publication comparing its spinning qualities with such costly cottons as the American-Egyptian cottons and several of the most prominent varieties grown in Egypt.

It is possible that the experiments at the Barberton greenhouse will result in a revolution in methods of fertilizing cotton. In these studies, Dr. Burt Johnson is seeking to find the correlation between methods of fertilizing and the resulting characteristics of the cotton lint as well as yield of the plant.

Gravel and water filled tanks, large, flat, shallow affairs, are kept at the temperature and humidity of a southern cotton field. A series of pumps at stated intervals flood the tanks with water in which fertilizers, the so-called "plant foods," are dissolved. Then in due time, the fertilizer solution runs off. The gravel merely acts as a means of support for the cotton plants growing in the tanks and furnishes no food.

Common practice in cotton growing has been to put all fertilizer in the ground in a narrow band near the seed row at the beginning of the season. Dr. Johnson in his greenhouse experiments has found that this may not necessarily be the best way. He has tried fertilizing some plants in this traditional fashion, while with others he has tried adding fertilizers at regular intervals throughout the growing season and particularly at the moment that the cotton bolls begin to form. So far, his results are only preliminary but they seem to indicate that the ideal way to grow cotton may be to put certain fertilizers in the ground at the start of the season, adding others later.

The important things, he believes, are to maintain a constant level of mineral nutrition at each stage of the plants' growth and to change the formula as needed, much as a mother changes the feeding formula of her growing child.

In trying out the new technique in the fields, the fertilizer is spread thinly over all the space between the two rows of plants. Instead of placing all the fertilizer at once, only one-sixth of the usual amount is used. Another sixth is spread before each succeeding cultivation, so that eventually the plant gets the same amount as would be used if the fertilizer had all been applied at once at the beginning of the season.

The preliminary results indicate that fibre properties may be influenced by mineral nutrition and that this can be accompanied by increased yield as well.

In carrying out the program, the laboratory has made tests of hundreds of samples of cotton for cotton breeders. In some cases these tests have even been carried to the extent of spinning the sample cotton into yarn, fashioning the yarn into cords, making tires with the cords, and running the tires through a series of rigid tests.

NATURAL GAS

A fuel whose value has been proven by years of use in a most diversified line of industrial applications.

Natural gas has created the possibility of effortless comfort by the facility, and economy with which it fits into the home.

SOUTHERN NATURAL GAS COMPANY

Watts Building **Birmingham, Ala.**

Exceptional Facilities for the Collection of Drafts

Remittance made on day of payment.

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ROBERT C. WILLIS, JR., *President*

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Member Federal Reserve System
Member Federal Deposit Insurance Corporation

While cosmopolitan in its general appeal, and modern *up to this moment* in its equipment, there is a peculiar flavor of The Old South here which Southerners are quick to note and appreciate. They feel at home and come back to us again and again.

Rates $3.00 per day and up. Every room with bath or shower. Centrally located.

The Southern Hotel
BALTIMORE 2

ENGINEERING · CONSTRUCTION · MANAGEMENT
JAHTC

INVESTIGATION of the physical and industrial facts, domestic and foreign.

PLANNING for the mechanical demands of the flow sheet.

REPORTS and ESTIMATES based on business and engineering economics.

CONSTRUCTION MANAGEMENT based on sound experience.

JOHN J. HARTE CO.

Engineers

ATLANTA **GEORGIA**

New Baltimore "Cat Cracker" in Operation

(*Continued from page 37*)

on the development of the process used in the new fluid catalytic cracking unit. Three pilot plants involving expenditures of nearly a million dollars were built before the present stage of fluid catalytic cracking was reached.

He paid tribute to the hundreds of workers whose toils led to the designs used in the new unit. More than five million man-hours of research, development and engineering endeavor were packed into creation of the fluid catalyst process. Engineering work on the Baltimore "cat cracker" alone cost about $300,000 with the number of man-hours spent on the design totaling 125,000.

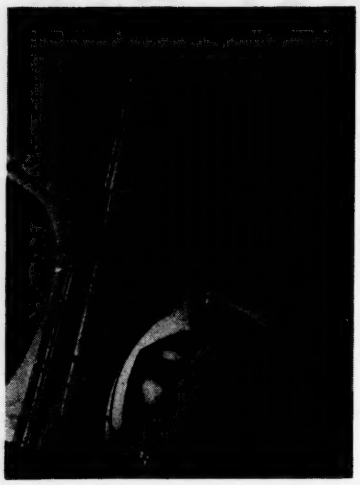
Fluid catalytic cracking is one of the three processes using chemicals as the catalyst, or "coaxer" to break down the petroleum and rearrange its molecules to produce the desired output of the various oils and gasoline. Fine clay-like white powder is the catalyst. When "fluffed up" by the vaporized oil or air, it flows like a liquid.

An entire box car of the catalyst, which is manufactured by the Davison Chemical Corp., of Baltimore, whirls every two minutes through the new Baltimore "cat cracker," although there is not a single moving part within the unit itself.

According to Mr. Russell, the amount of catalyst flowing through the unit each day has a surface as large as the entire ground area of the United States. Although the quantities of catalyst circulated are tremendous, less than one-quarter pound is lost per barrel of oil fed into the unit.

The operation is quiet and to the observer there is no indication of the job being done within the maze of pipes and towers. Control panels, with their many dials, pointers and regulators are the outward evidence of what is going on inside the maze of pipe and vessels. These include such delicate instruments as the Leeds and Northrop Micromax and the Brown rate of flow meters made by Minneapolis-Honeywell Regulator Co.

Raw material fed into the intricate network of pipe, drums and towers of the fluid catlytic cracker is known as gas oil. A "cut" or part of the crude oil, this fluid is heavier than kerosene but lighter than fuel oil. When the vaporized gasoil is injected into the unit, the cracking takes place. At the same time carbon is deposited on the catalyst. The carbon is burned off in what is known as regeneration.



This debutanizer is part of the modernized plant which Standard of New Jersey recently dedicated at Baltimore.

Burning the carbon from the catalyst generates the heat by which the cracking process is carried out. There are no furnaces in the new fluid catalyst cracking unit. Small auxiliary heaters start the "cat cracker" at its work. After that, it utilizes the heat from the carbon burning operation in what might be called a perpetual motion cycle.

Pressure and heat are important in the refining processes. For instance, the catalyst cracking unit operates at low pressure. To bring the pressure up to the higher levels required in other stages of the operation requires large compressors, such as the Ingersoll-Rand, 600-horsepower gas driven units. Refrigeration in furnished by Clark compressors.

Construction of the fluid catalytic cracking unit was carried out under supervision of Paul Weberling, superintendent of construction for M. W. Kellogg, with Charles Killinger, of Standard Oil Company's general engineering department, acting as expediter. Dr. M. R. Meacham is manager of the Baltimore refinery; William Naden, general superintendent, and H. G. McBurney, process superintendent. Herman G. Gunter will supervise operation of the new cracking unit.

The accelerated program of high octane gasoline production dates back to 1940, when officials of the Standard Oil Company of New Jersey through their president, the late W. S. Farish, who was also chairman of the committee on defense policies of the American Petroleum Institute, expressed their concern about the situation in a letter addressed to manufacturers of 100-octane gasoline. Mr. Farish advanced the opinion that additional production facilities should be built.

Establishment of the priority in 1941 complicated the outlook for additional plant construction and it was not until shortly after creation of the Federal petroleum coordinator's office in the fall of that year that a clear policy began to emerge. Estimates placed requirements far above the industry's then existing capacity. The O. P. C., since changed to Petroleum Administration for War, suggested large additional capacity to be constructed by July, 1942, with a further 50 per cent increase by July, 1943.

Seventy-two major 100-octane plants were included in the war petroleum administration's 1942-43 construction program. Thirty-two have been completed and 40 will be completed during the next several months. Twenty-two others will be built in 1944. Completion of such projects, Administrator Harold L. Ickes said, requires more than a year.

Baltimore's new cat cracker has profited by the lessons learned from the earlier fluid catalytic cracking units. It is the very latest fruit of American scientific and engineering skill. The very highest octane ratings are possible with this new unit.

(S. A. L.)

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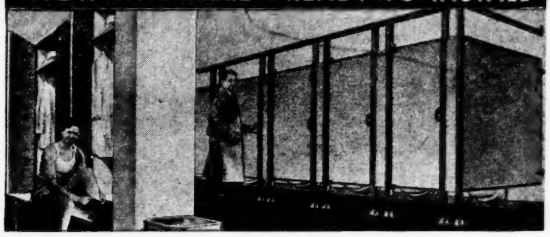

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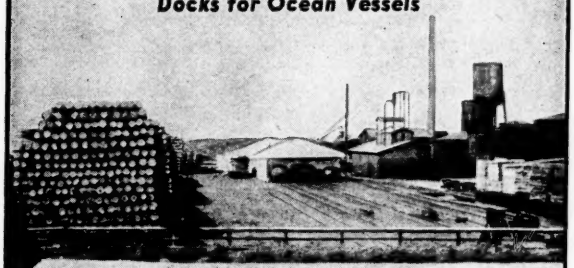

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TRADE LITERATURE

And Related Publications

NEW LOCKWOOD PAPER DIRECTORY—
The 69th edition of Lockwood's Directory of the Paper and Allied Trades, for the year 1944, is off the press. It is a 1,222-page guide to the paper industry published by the Lockwood Trade Journal Co., Inc., 15 West 47th St., New York 19.

The directory lists all paper, ground wood pulp and chemical fibre mills in the United States, Canada, Cuba and Mexico, together with information on their executives, products, equipment and considerable other data. The issue contains reports on the paper and pulp mills of South America and Trinidad.

Manufacturers of glazed and coated paper and board are lists with trade information relating to each. There is a converter's section and additional sections related to paper dealers, rag and stockdealers, statistical information, etc.

In addition to its large format, the directory is issued in a pocket-size travelers' edition.

NEW STANDARDS LIST—
The American Standards Association announces the publication of its new list of standards. There are more than 600 standards listed, of which 64 have been approved or revised since the last price list was printed (April, 1943). The standards cover specifications for materials, methods of tests, dimensions, definitions of technical terms, procedures, etc.

LUMBER ASSOCIATION DATA BOOK—
"Lumber Industry Facts" (1943 edition) has just been released by the National Lumber Manufacturers Association. The book presents important information which may help toward well-informed understanding of the forest industries, determination of sound public policy, and provision within the forest products industries of dependable sources of business and employment. It contains 78 statistical tables and 23 charts.

Single copies will be mailed upon request to the Statistical Division, National Lumber Manufacturers Association, 1319 18th St., N. W., Washington 6, D. C.

GRINDING EQUIPMENT BOOKLET—
DoALL surface grinding equipment, accessories and supplies manufactured by the Savage Tool Company, Savage, Minn., are described in a new twenty page booklet now being distributed to the metal working industries.

Also shown is the production methods used in the manufacture of these surface grinders and a brief description of the DoALL precision gage blocks and instruments manufactured by this company.

INDUSTRIAL ORGANIZATION—
"Principles of Modern Industrial Organization," by Walter Rautenstrauch, LL.D., answers problems that continually bedevil industrialists under the increasing pressures of mass production. It is a comprehensive study of the principles of industrial organization evolved by the professor of industrial engineering at Columbia University. Pitman Publishing Corp., New York and Chicago, $3.75.

TIMELY ARC WELDING BOOK—
A timely contribution to today's literature of welding, "Maintenance Arc Welding," has been published by the James F. Lincoln Arc Welding Foundation, Cleveland. It is the second important book to be developed from the 1940-42 Industrial Progress Award Program. Comprising 25 of the most significant award papers in the program's maintenance classification, the new volume will be found particularly useful in keeping machinery and plants in operation despite critical shortages in materials and equipment. This compilation of outstanding maintenance studies deals with the use of arc welding in reclaiming broken and worn parts and also gives details on the application of welding in the fabrication of replacements. The book contains 233 pages and 242 illustrations.

WEST VIRGINIA SALT DEPOSITS—
"Rock Salt Deposits of West Virginia" is the title of a bulletin by Dr. James H. C. Martens, of the West Virginia Geological and Economic Survey, P. O. Box 879, Morgantown. It is obtainable for 50 cents.

SPEED PRIME PUMPS
A catalog of Rex Speed Prime Pumps, containing specifications and capacity charts to aid in pump selection, is off the press. Rex Pumps are made in capacities ranging from 3,000 to 125,000 gallons per hour. Their chief use is for dewatering purposes. Copies of this book may be obtained by writing to Chain Belt Company, 1600 West Bruce St., Milwaukee, Wis.

MENGEL COMPANY'S DEVELOPMENT—
The Mengel Company of Louisville has issued its first booklet descriptive of the company and its history for distribution to its stockholders, employes, customers and others. Entitled, "The Mengel Company Since 1877," the attractive illustrated booklet shows the men, machinery and operations that make up the nation's largest hardwood plywood producer.

Sixty-six years of growth are reflected, during which Mengel has turned out veneers, plywoods, lumber and machined wood products, complete bedroom suites and parts of prefabricated and other houses. The booklet stresses Mengel's current concentration on war production, which includes Army truck body parts, aircraft plywood, military boat plywood and crates and boxes. Copies may be obtained free by addressing the company.

PORTER LOCOMOTIVES—
"Porter Steam Locomotives," a 68-page catalogue giving technical data on the most complete line of industrial locomotives built in the United States, as well as railroad switching locomotives, has been announced by H. K. Porter Company, Inc., Pittsburgh, Pa. Latest in a series dating back 75 years to when Porter began locomotive manufacture, the catalogue represents an authoritative review of the current field of industrial and switching steam engines. More than 50 locomotive types are illustrated.

NEW GASKET AND PACKING ITEMS—
A folder containing samples and descriptions of two new gasket materials and a fibrated leather packing has been issued by the industrial division of the Armstrong Cork Co., Lancaster, Pa.

OKLAHOMA'S RESOURCES—
In an effort to attract more industries to Oklahoma, the Industrial Development Department of Frisco Railway, St. Louis, has compiled a booklet containing a summary of available mineral and raw materials to demonstrate the field of possibilities for potential enterprises within the state. Entitled "Oklahoma Mineral Wealth," the booklet is the result of a study made in conjunction with the Oklahoma Geological Survey.

1944 PLASTICS CATALOG—
Publication of the 1944 Plastics Catalog brings up to date the history and achievements of plastics materials in every branch of industry. The great shift in production from civilian to war goods is portrayed in a wide variety of products illustrated in the new edition of this well-known annual. The 1944 edition contains more than 1,000 pages of informative, authoritative material. Articles usher into public view many new materials, new manufacturing methods. The catalog sells for $6 and is published at 122 E. 42nd St., New York.

REGULATOR DESCRIBED IN BOOKLET—
A booklet containing detailed analysis and cutaway illustrations of the gas-loaded diaphragm regulator, as opposed to the spring loaded type, is published by the Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif. It features the firm's Gas-O-Dome regulator.

AIRPLANE WING JACKS—
The wide line of Duff-Norton Airplane Wing Jacks is completely described in a new 8-page bulletin just issued by The Duff-Norton Manufacturing Co. The line includes mechanical jacks for every requirement in landing gear, strut and undercarriage repair. Feature of Duff-Norton Airplane Jacks, according to the maker, is their absolute safety—no "creeping" or settling. Copies of the bulletin may be secured from The Duff-Norton Manufacturing Co., Pittsburgh 12, Pa. Ask for bulletin No. DN-3410.

MATERIALS HANDLING MACHINERY—
A handsome three-color looseleaf book o
"Modern Materials Handling Machinery
has been produced by the Yale & Town
Manufacturing Co., Philadelphia 24, P
The book starts with the premise that "th
next great reduction in American produc
tion costs can be effected by cutting mate
rials handling costs, with the use of th
most modern equipment and methods." A
analysis of materials movement through th
stages of receiving, production and ship
ping is then given by means of drawing
showing various handling problems and th
machinery that meets them.

The bulk of the book is devoted to a pic
torial review of Yale & Towne machiner
in action. This includes photographs take
in a wide variety of industrial plants, som
of the operations making highly strikin
pictures. At the end of the volume are dis
played latest models of hand-lift and elec
tric trucks, electric load carriers, crane
high-lift form and ram trucks, etc.

"Unlike the long-established machine too
industry, that of machine tools handlin
machinery is still in its infancy," the com
pany comments, "Because the industry is s
new, little information of a practical, func
tional nature has been released to manage
ment about modern, efficient handling equip
ment. . . It is our hope that the practica
functional demonstrations of modern mate
rials handling machinery given in this boo
will encourage the attention the subjec
merits."

PACKING HELP—
A helpful guide for selection of packing
is offered by Greene, Tweed & Company
Bronx Boulevard and 238th Street, New
York. It lists three dozen fluids handled i
process work and general plant services an
lists the correct packing for each.

WPB BRINGS OUT "REDISTRIBUTOR"—
The first issue of the War Productio
Board "Redistributor" came off the pres
Dec. 24. It is designed "to bring about th
use of surplus materials, equipment an
machinery in war and permitted civilia
production." It will be issued by WPB re
gional offices, and will list items for sal
and items wanted.

NEW INDUSTRIAL PLANTS—
A copiously illustrated booklet, "What'
New in Modern Plants," has been publishe
by Ford, Bacon & Davis, Engineers an
Constructors, 39 Broadway, New York
Pointing out that plant sites are now bein
chosen "for strategic business reason
rather than on hunches or preferences o
because real estate is available," the book
let continues:

"Labor situations, markets, raw mate
rials, taxes and transportation are controll
ling answers. In some cases the savings her
can offset the whole cost of a new plant.
Importance of having industrial and operat
ing engineers work with the builders i
stressed, to the end that the plant may
produce at the best cost, fit the job and pro
vide for growth and changes.

AIR CONDITIONING AND THE WAR—
Many parts of Uncle Sam's airplane en
gines have to fit with a tolerance of only
3/100,000ths of an inch, and the spread be
tween a hot day in Los Angeles and a col
day in Buffalo can make a good deal mor
difference than that through expansion o
contraction of metals. So delicate war ma
chinery is put together in air-conditione
atmosphere.

This example of how clean, dry, equabl
air in war plants is less a comfort than
necessity keynotes an attractive illustrate
booklet, "Refrigeration and Air Condition
ing . . . in War . . . in Peace." It has jus
been issued by the Air Conditioning and Re
frigerating Machinery Association, Inc., o
Washington, D. C. Many other industria
and military applications of air condition
ing are cited, including its obviously vita
role in food preservation.

SOUTH CAROLINA POPULATION—
An exhaustive historical and curren
study of South Carolina's population, pre
pared for the State Planning Board b
Julian J. Petty of the University of Sout
Carolina, has just been published by th
dustrial Development Committee of the Stat
Council for Defense. Titled, "The Growt
and Distribution of Population in Sout
Carolina" contains 230 pages of text, wel
illustrated with maps, charts and tables
Broad aspects of economic and social devel
opment are dealt with, and the study con
cludes with an examination of current fac
tors influencing size, character and distri
bution of the state's people and a look int
the probable future. The book is obtainabl
from the State Planning Board, 100 Calhou
State Office Bldg., Columbia.

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Manufacturing Wages Rise Faster Than Living Costs

Tables issued by the Chamber of Commerce of the United States show that wages in manufacturing industries have increased more rapidly than the cost of living, either when studied on an hourly basis or as weekly earnings. Though the figures themselves come from the Department of Labor, the Chamber's Department of Manufacture charges the government agency "fails to provide comparisons which present the whole picture."

From September, 1942—the base period fixed in the Price Control Act—to September, 1943, the following increases were recorded:

Cost of Living Index up..... 5%
Weekly Earnings up..... 17%
Hourly Earnings up..... 11%

From January, 1941—base month of the Little Steel Formula—to September, 1943:

Cost of Living Index up..... 23%
Weekly Earnings up..... 66%
Hourly Earnings up..... 45%

Carrying the comparison clear back to August, 1939, last month before the outbreak of the European war, the Chamber finds the cost of living index up 26 per cent as of last September, with weekly and hourly earnings up 87 and 59 per cent respectively.

Steel Recovery Corporation Voluntarily Closes Doors

One federal agency has voluntarily gone out of operation with the turn of the year, leaving behind a record of successful operation achieved at 1 per cent of the cost originally estimated.

It is the Steel Recovery Corporation, organized under the salvage program of the War Production Board to move idle and excess steel into useful channels. A group of practical steel men called together by the government, it was first headed by George L. Stewart, vice president of Edgar T. Ward's Sons Company of Pittsburgh, who was succeeded by Charles F. Cruciger, vice president of Spang Chalfant Inc.

After its organization August 6, 1942, the corporation called on a quarter of a million possible holders of idle and excess steel to help meet the critical shortage of that commodity. Returns averaged nearly 10,000 items a day, and the personnel reached a peak of 549. Much of the business of supplying steel from unused stocks was done by bringing buyer and seller together, among the chief beneficiaries being manufacturers of farm equipment, gasoline drums, galley gear, ship structural steel, mess trays and cans.

One deal saved the government 30 cents a unit on orders for 7,000,000 soldier identification tags. Another sent 3,500 tons of steel for emergency use making drums for high octane gasoline.

The corporation found that a high percentage of inventories could be matched with a demand for finished items, and that the tremendous remelting job originally planned was unnecessary. Less than one-tenth of the steel located was sent through for remelt.

Headquarters of the Steel Recovery Corporation was in Pittsburgh. Future distribution of idle and excess steel will be carried on by regional offices of the War Production Board.

Warren T. White Put In Charge of Seaboard Railway Public Relations

WARREN T. WHITE

The appointment of Warren T. White as Special Assistant to Receivers has been announced by L. R. Powell, Jr., and Henry W. Anderson, Receivers of the Seaboard Railway. In addition to special assignments, Mr. White will have charge of public relations matters.

"The Seaboard recognizes the value of mutual understanding and good will as the bases for satisfactory business relations," the announcement stated. "For many years the railway has enjoyed to a high degree the good will and friendship of its patrons. By keeping the public currently informed through appropriate media concerning policies and matters of mutual interest the new program will seek to bring about even closer understanding between the Seaboard and the public."

Mr. White is considered eminently qualified for his new field of activity. He has been connected with the Seaboard for the past twenty-one years, the past sixteen as head of the Industrial Development Department. During this time he has been intimately associated with the commercial and industrial life of the South and is thoroughly acquainted with its people as well as its problems and resources. Under his direction the Industrial Department of the Seaboard has been instrumental in bringing scores of new industries to the South with new payrolls aggregating many millions of dollars.

The Industrial Department of the Seaboard, under his direction, has pioneered in the development of the pulp and paper industry in the Southeast. During the period 1935-1940 thirteen large pulp and paper mills were constructed in states served by the line.

Mr. White was born at Centenary, South Carolina. He attended local grammar and high schools of Marion County, and, following his graduation from Clemson in 1917 he served for two years as an army officer in the first World War.

War Sulphur Needs Being Met At No Price Rise

"The American sulphur industry, a the conclusion of a year in which a wartime demands were met in full at n price increase, begins 1944 with produc tive capacity and stocks sufficient to fi Allied needs during the expected fina industrial and military offensive again the Axis." Langbourne M. Williams, Jr. president of Freeport Sulphur Company gave this assurance in reviewing th year 1943 in the sulphur industry.

"During the year just ended U. S industry consumed a new record total o sulphur in producing the weapons, ex plosives, fuels and machines of war," Mr. Williams continued. "Many sulphu consumers were able in 1943 to draw i part from their own inventories and a a result domestic and foreign shipment were estimated at approximately 3,000, 000 long tons compared with 3,121,12 tons in 1943.

"The loss of Sicily, which had made Italy the world's second largest sulphu producer, deprived the Axis of an an nual supply of some 200,000 tons. Al though Germany relies chiefly upon European pyrites and other sulphide ores as sources of sulphur for sulphuric acid, press reports from Europe have stated that the Reich is short of sul phuric acid.

"On the industrial home front, sul phur played strategic roles in the pro duction of scores of war essentials. Sul phur participates at three points in the flowsheet of the new synthetic rubbe industry. In agriculture and gardening the demand for refined sulphurs for spraying and dusting reached a new peak. Some 20,000,000 Victory garden provided a vigorous new outlet. In the use of sulphur as a chemical agent in food treatment, advances were also made.

"Other industrial products requiring sulphur in their manufacture made technological progress during the year Viscose rayon, for example, came into extensive use in the construction of the new synthetic rubber tires because of its excellent heat resistant properties."

David B. Piersen Dies

David B. Piersen, chairman of the board of directors of the Stephens-Adamson Manufacturing Co., Aurora, Illinois, died November 29 of a heart at tack at the age of 63.

Mr. Piersen started with Stephens-Adamson, when that company was founded in 1900 and served as sales manager, secretary and vice president before being elected president in 1914. Since 1934 he had been active in sales and administration as chairman of the board.

New Gas Detector

A vigilant "safety patrolman," with an electric eye that detects invisible gases and vapors, has been developed by Du Pont scientists to warn of dangerous concentrations of these compounds in the atmosphere of manufacturing plants. Known as an ultraviolet photo meter, the instrument is so sensitive that it can detect one part of carbon disulfide, for example, in a million parts of air.

Unusually

Heavy Trusses

Electric Arc Welded

Over the Auditorium of the
George Washington Hotel
Jacksonville, Florida

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AT LOWER COST

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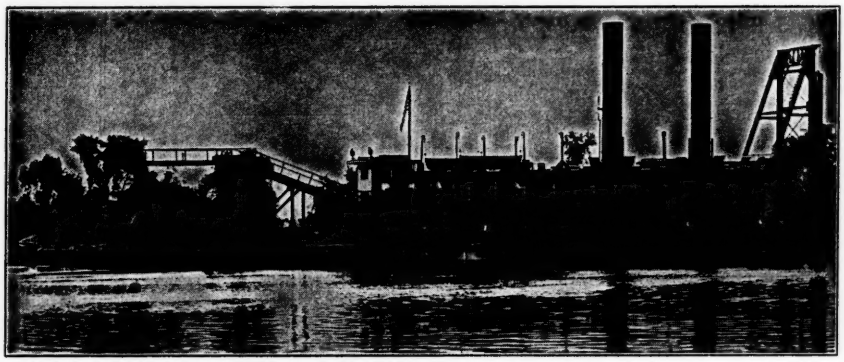

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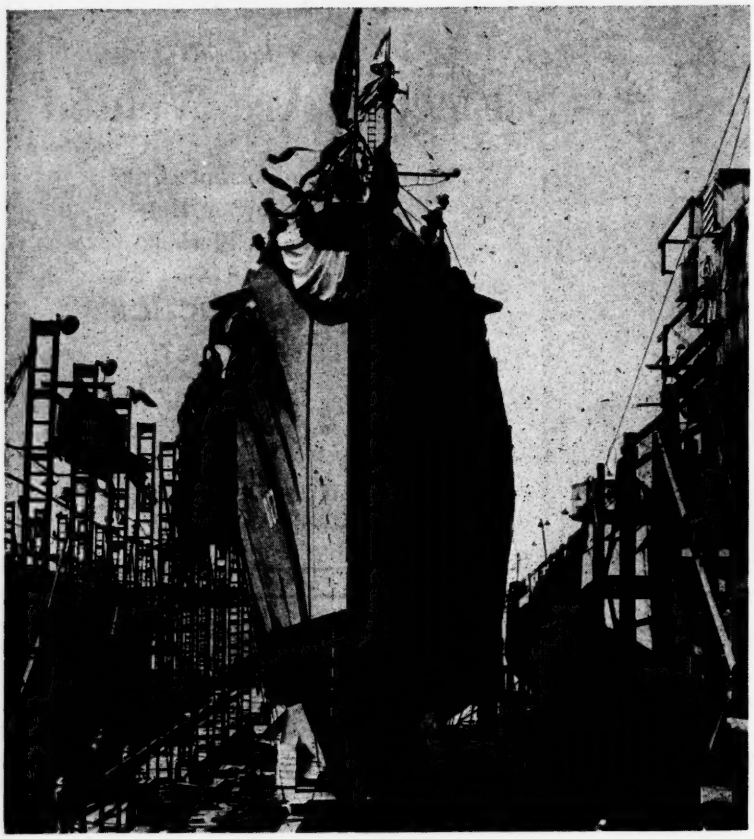

Tampa Shipbuilding Co., Inc., Tampa, Fla., headed by George E. Howell, has launched more than two dozen ships since Pearl Harbor. A destroyer escort is shown at launching.

H. K. Ferguson, Engineer and Builder, Dies

Harold K. Ferguson, one of the foremost industrial engineers and builders in the United States, died Dec. 9 several hours after suffering a heart attack in his Cleveland office. He was 60 years old.

Mr. Ferguson was president of the H. K. Ferguson Company, engineers and builders, a firm which he founded in 1918. In the country's war effort it has played a prominent role in designing and building manufacturing plants. When the company celebrated its twenty-fifth anniversary last April, Mr. Ferguson complimented his associates and employes for "the record after record you have continually achieved." The company's activities have extended to Canada, Mexico and the Orient.

Among the large corporations for which the Ferguson concern has built and equipped plants are Procter & Gamble, National Cash Register, General Foods, Firestone Tire & Rubber and Union Carbide & Carbon. After entering emergency war construction, the company was quickly awarded the Army and Navy "E," among its achievements being the building of a synthetic rubber plant in twenty weeks.

Mr. Ferguson was born in Albion, Mich., Nov. 22, 1883, and was a graduate of Ohio Wesleyan University. He was father of four children.

Hercules Post-War Plans Exceed Any Peace Year's

The postwar American chemical industry will employ "considerably more" workers than in prewar years, and chemical plants are ready to swing over to peacetime production the day the war ends, Charles A. Higgins, president of Hercules Powder Company, reports in his 1943 review. His statement emphasized that the wartime accomplishments of American chemists would "stand up" after the war.

"The war has simply accelerated the development of the chemical industry," he said. "Some of the so-called substitutes are better than what they have replaced. Under the impetus of war, these materials have been moved from the research laboratory into actual use much faster than it would have been possible under a peacetime economy. But they are here to stay."

The chemical industry as compared with other major industries engaged in the war program faces hardly any problem of reconversion to peacetime production, because its products are essentially "intermediates," he said.

Hercules has drawn up plans for a plant construction program after the war that will far exceed the expansion program of any prewar year. Higgins cited cellulose derivatives for plastics, and terpene and rosin chemicals, as the main products figuring in this postwar expansion.

General Motors Rate Of War Production per Dollar Makes Sharp Gain

In the two years since Pearl Harbor General Motors has produced a total of more than $5,000,000,000 worth of war materials and is now producing at a rate exceeding $12,500,000 a day, C. E. Wilson, president of General Motors, announces. These figures compare with defense production which was running at a rate of about $2,000,000 a day at the time of Pearl Harbor.

The present $12,500,000-a-day production is providing the armed forces with much more equipment than the same amount of money would have provided a year ago through mass production techniques and engineering know-how. Thus, while General Motors production as measured in dollars will have about doubled in 1943 over 1942, production in terms of physical volume will be about two and four-tenths times as much in 1943 as in 1942.

The corporation with its vast network of subcontractors and suppliers is producing more than 2,300 separate items for war use. These range from ball bearings so tiny that it takes 3,000 to fill a thimble to mighty tanks weighing 30 tons each.

Approximately one-half of the current General Motors war production is in the aircraft field—complete planes, engines, propellers, subassemblies and parts.

General Motors war production is being carried on in 116 plants in 47 communities in the United States, in five plants in Canada and in plants in other United Nations — including England, Australia, India, New Zealand, South Africa and Egypt. The number of General Motors employes, which averaged 304,000 in 1941, has risen to a great production army of about 500,000. The corporation has been aided in its tremendous war effort by nearly 19,000 suppliers and subcontractors. GM employes in the armed services now number approximately 83,000.

Suggestions by employes for aiding war production have totaled 160,533 since the GM Employe Suggestion Plan was expanded in April, 1942. The 25,989 awards made for accepted suggestions total $1,028,155.

G. S. May Golf Foundation

George S. May, who heads the business engineering organization bearing his name, has announced formation of the American Golf Foundation, intended to apply sound business principles to golf club management. A non-profit organization, the Foundation has been brought into being, Mr. May explains, because "the postwar outlook for thousands of golf clubs is far from bright unless they are scientifically managed with strong emphasis on cost control—about one club in ten is in financially sound condition."

Sponsorship of the AGF by the May engineering firm is logical, Mr. May believes, because of his firm's past experience with management problems in some 8,000 engineering jobs, and operation of his own Tam O'Shanter Club as a "guinea pig" for club management experiments.

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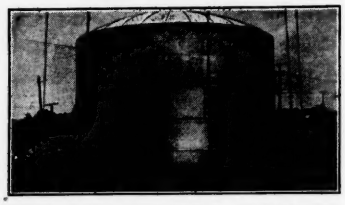

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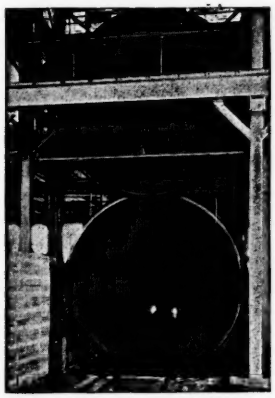

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Girdler on Post-War Industrial Plans

Asserting that our war experience is the best basis for building a virile post-war economy, and that the key is production, T. M. Girdler discussed the nation's economic outlook before the Second War Congress of the National Association of Manufacturers.

Speaking from his knowledge as chairman of the Republic Steel Corporation and the Consolidated Vultee Aircraft Corporation, Mr. Girdler first spoke briefly of the industries to which those firms belong.

"Modern wars are fought with steel," he said, "and thus steel is an infallible yardstick in the measurement of the scope of the war. The peak production of steel in World War I came in 1917, with a total of 50,500,000 tons. This year our steel output will be close to 90 million tons and our steel capacity is soon to reach 96 million tons. Think of it! That 96 million tons of steel will nearly match the output of all the rest of the world put together.

"The aircraft industry ranked only 75th in size among American industries in 1939. It was second in 1942 and now it's first. Its annual production is now five times that of the biggest year the automobile industry ever had. At the end of 1940 Liberator bombers produced in very limited quantities required for each bomber the equivalent of 100 direct workers working one year; at the end of 1941, 35; at the end of 1942, 12; at present, 7; and the ratio is still improving. In other words, we are now producing 14 Liberators for the same direct labor that built only one three years ago.

"Sometimes these achievements are characterized as miracles, but I say mistakenly so. They are the natural outcome of America's creative enterprise operating within the pattern of an economy that rewards men for work well done. Call it the profit system or the incentive system or private enterprise or what you will. The fact remains that under it American industry has given in this war a smashing demonstration of its tremendous vitality and its vast potentialities."

Turning to the postwar outlook, Girdler continued:

"A matter of prime importance is the economic and political atmosphere in which industry will function in the post war period. That in the final analysis must be determined by the people of America. They must decide whether they want to preserve or to scuttle the American enterprise system. I have no fear about what their decision will be on that point.

"I believe industrial peace and co-operation between industry and labor is one of the prime requisites of prosperity in the post-war period. There are four cornerstones upon which such a peace may be built, and I would describe them as follows:

"1. Recognition of the principle of collective bargaining;

"2. Recognition of the right of employees to join or not to join any labor organization;

"3. Scrapping of the 'class conflict' idea in labor management relations and recognition that cooperation between man and management naturally follows mutual understanding of each others' problems.

"4. Incentive for investment and work—a fair return for venture capital, and fair wages for employees."

Mr. Girdler emphasized that "no business man in his right mind expects to make a large profit out of the war."

"That is a problem settled and disposed of, I hope, for all time," he said. "But it is no friend of the American enterprise system who interprets the barrier to large war profits to mean that industry must not be allowed to provide for its own post-war survival.

"To cite the example of the aircraft industry, the cold fact is that this industry will be bankrupt in 30 days after the war if there is no proper solution of the contract termination problem.

"Our war experience is the best possible basis for building a strong and virile post-war economy. The key is production. But it must be unity which achieves it—unity of all groups. Labor, management, agriculture and government must work together for an abundant and prosperous America."

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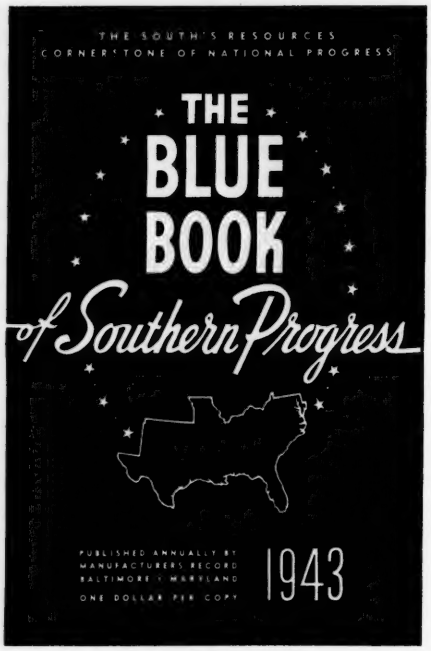

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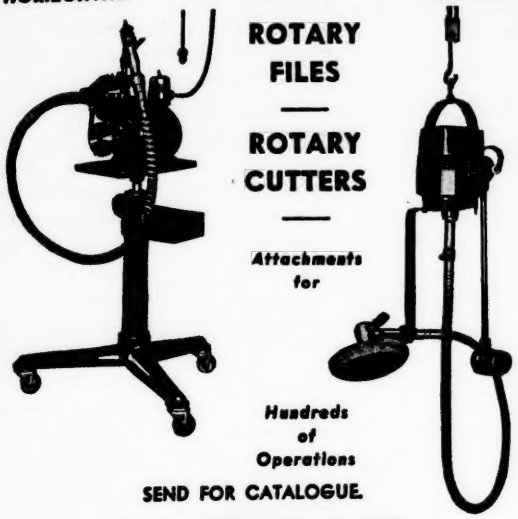

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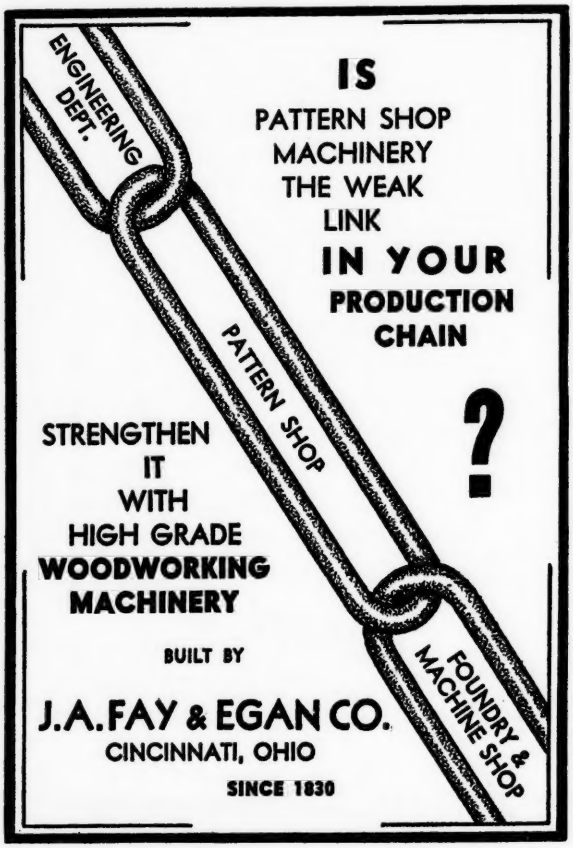

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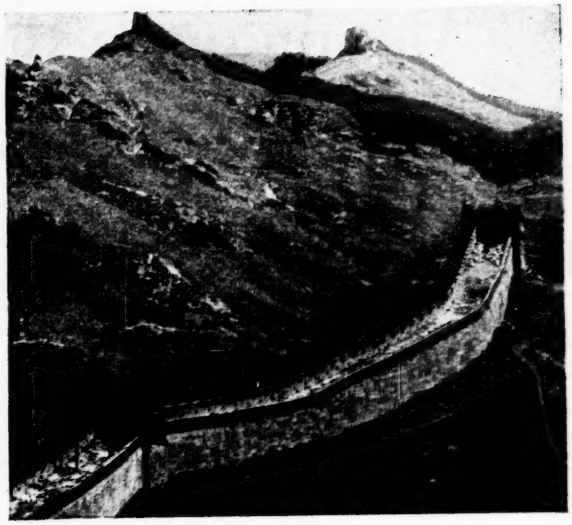

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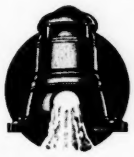

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Aluminum in the Post-War World

(*Continued from Page* 29)

candy bars, chewing gum, camera film, yeast cakes, as well as collapsible aluminum tubes for products ranging from roofing compounds to shaving cream.

Pre-war brewers found aluminum barrels desirable in many ways. The metal is non-toxic and has no deteriorating effect on the taste, color and other properties of beer. Barrels of such metal are light in weight and easy to handle.

Conductivity and light weight make aluminum a good electrical possibility. More than a million miles of high voltage aluminum conductor cable with steel reinforcement span the country. A post-war increase in aluminum in the power industry is expected because the lower cost will make the metal available for insulated cable and wire for both industrial and domestic use. Aluminum has been barred in the past by one factor—cost.

Aluminum will team with plastics where the combination can do a better job.

Aluminum's position in post-war architecture is foreordained. Early applications in this field were mainly spandrels for public buildings, and decorative trim both inside and outside. A few buildings were equipped with aluminum window assemblies. Aluminum foil had made a start as an insulation material. These and other uses are expected to expand tremendously after the war.

New finishes have been developed for aluminum—finishes designed to enhance the appearance of the metal and improve its wearing and corrosion-resisting properties. Aluminum paint was well established at the outbreak of war. Bridges, water tanks and other government and municipal property were widely covered with the silvery coating.

Officials in the industry say aluminum utensils will be welcomed back after the war by the housewife. First post-war models will be essentially the same as those before hostilities. Newer designs will follow, they indicate.

Furniture manufacture is expected to provide an outlet for post-war aluminum. Another fertile field will be in manufacture of household appliances. Improved assembling and finishing methods will combine with lower metal costs to compete for a place in equipment such as stoves, steam electric irons, refrigerators and cabinets.

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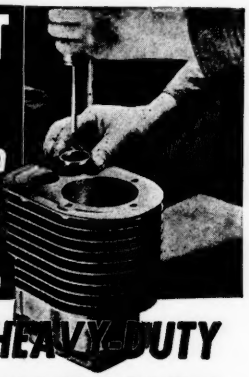

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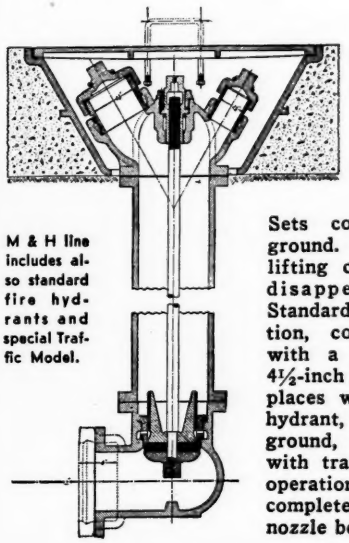

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Output of Electric Power Breaks All Records

By C. W. KELLOGG
President, Edison Electric Institute

The year 1943 has justified the optimistic predictions which the electric utility industry has consistently made as to its ability to supply the war load of the United States. No war program has been delayed by lack of electric generating capacity and, at the same time. full service has been maintained to the civilian population.

This increased war and civilian load has been reflected in the largest gain in revenues in the history of electric supply, but none of this gain in revenue has reached the stockholder.

The consolidated income statement of the utility companies for 1943 will show a gain in gross revenues of $207,000,000 over 1942 to an estimated total of $2,816,000,000. According to financial reports published for the first ten months of the year (with November and December estimated) increased operating expenses and depreciation absorbed $138,000,000 of this revenue gain, while State and local taxes showed only a slight change.

As a result, net income after all charges, but before Federal taxes, is expected to show a gain of $78,000,000 or nearly 9 per cent over a year ago. Federal taxes, however, have increased by $80,000,000, so that net income is reduced to $495,000,000 as compared with $497,000,000 for the previous year.

Installed capacity in the public utility power houses increased during the year by more than 3,000,000 kilowatts, bringing the total at the present time to about 49,500,000. During the past five years, generating capacity has grown by almost 11,000,000 kilowatts, which increase alone is greater than the entire capacity of all the country's power houses at the beginning of the last war.

Since the nation's monthly war expenditures have shown little change during the past nine months, it seems likely that the scale of America's gigantic industrial war effort has reached its climax and that the demand for electric power, even with the continuation of the most active field campaign, will be stabilized at approximately present levels. The installation of additional generating machinery is accordingly expected to taper off, with only 1¼ million kilowatts scheduled for 1944 and some one-half million more in 1945.

In 1943 the electric utility companies of the United States spent for new construction in round numbers, $265,000,000. This compares with a total of $456,000,000 in 1942.

The sum of the peak loads at the generating stations for December 1943, for all plants contributing to the public supply, is estimated to have been 41,000,000 kilowatts. This is 4,300,000 kilowatts, or 12 per cent, above the figure for last year.

Output of electricity in 1943 by all agencies contributing to the public supply totaled approximately 221 billion kilowatt hours, an increase of 32 billion, or 17 per cent, over the production in 1942.

In the four years from September, 1939, when the Germans invaded Poland, to the present time, the total output of electricity has grown from 126 billion kilowatt hours per year to 221 billion, or by 75 per cent, while generating capacity has grown by only 25 per cent. This has been due to the higher "load factors," resulting from longer hours and additional shifts in industry, and from the increase in the size and number of chemical and metallurgical plants where furnaces are operated continuously.

The most striking feature of the entire war expansion has been the development of the metallurgical load; that is, the manufacture of aluminum, magnesium, electric steel and ferro-alloys. This type of load now constitutes the largest single classification of electric use.

In sharp contrast to the rising cost of living and of doing business, the average unit price of electricity in the home continued to decline and is now about 3.64 cents per kilowatthour—an all-time low.

Civilian Working Force Is Set at 51,500,000

The civilian working force of the nation as revealed in a tabulation of manpower progress on December 1 stands at 51,500,000. Paul V. McNutt, chairman of the War Manpower Commission, cited local employment stabilization plans, employment ceilings in labor shortage areas and extension of the 48-hour week among factors responsible for "a more efficient utilization of American manpower," in announcing the figure.

Establishment of controlled referral programs, designed to direct the right man to the right job, was also credited, together with special recruitment programs in certain cases of threatened critical shortage, such as nonferrous metal mining.

McNutt said there had been a readjustment of production schedules from an "incentive" basis to a "feasible expectation" basis, permitting a sound readjustment in labor requirements. Discussing the attempt to cushion the effect of cutbacks, he said:

"Present cutbacks represent shifts in types of production necessary to meet strategic requirements. In terms of total numbers of workers they are not large. But they must be made in the right places. Cutbacks in production must take into account war manpower classification of labor market areas."

The 48-hour week was in effect by the end of the year in a majority of the 193 labor shortage areas, McNutt said. Among these areas, it was explained, are 69 in which acute shortages have actually developed. They are classified as Group I. The remainder, classified as Group II, are those in which it is anticipated "acute" shortages will develop within six months.

As an example of the reduction of labor demands which has been brought about by the application of the 48-hour week, Mr. McNutt referred to Akron, Ohio, where it had been estimated that its labor requirements had been reduced by 10,000. In the Detroit area it was reported that although many employers are not laying off personnel they are granting releases to employees desiring them without replacing those released.

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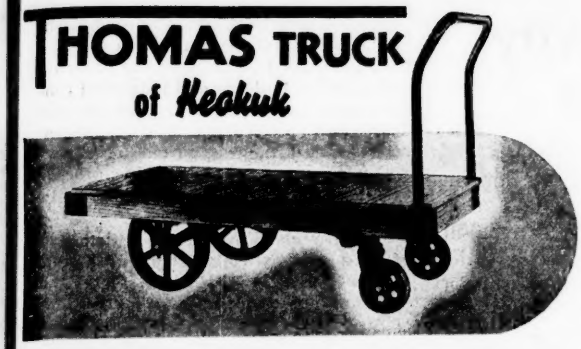

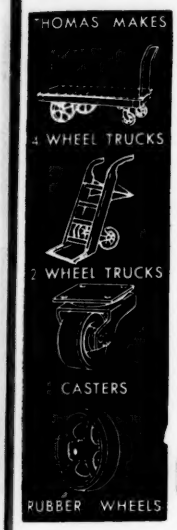

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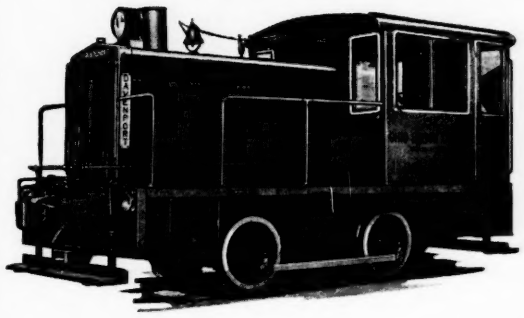

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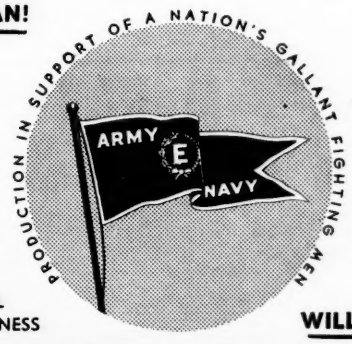

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WILL YOU?

DAVENPORT LOCOMOTIVE WORKS
A DIVISION OF DAVENPORT BESLER CORPORATION, DAVENPORT, IOWA

Economic Center of Gravity Shifts South and West

(*Continued from page* 27)

national average in the Atlantic coastal section of the South, but above it in the rest of the South.

Income

The geographical shift in the amount of individual income has been more marked than the shifts in population or employment, and the South's share of increased wartime income contrasts sharply and favorably with the national average.

Pointing out that "data on income payments constitute the most all-inclusive economic statistics available by states," Economist Stokes has recorded them for the four years of 1939-1942. The income payments include net salaries and wages, other labor income, entrepreneurial income dividends, interest, etc.

The net shift in such income from areas of relative loss to areas of relative gain amounts to more than $5,000,000,000, or nearly 5 per cent of the national total.

The increase for the country as a whole is 61.5 per cent. The highest rate of any area in the country is in the South Central block — Kentucky, Tennessee, Alabama and Mississippi—and is 83.1 per cent. This tops the 80.9 per cent increase reported by the booming Pacific Coast. The Atlantic Seaboard Southern states are well above the national average with 73.9 per cent increase, while the western area of the South shows 78.1 per cent.

Other Indicators

In two other business indicators, bank debits and consumption of electrical energy, we find marked increases throughout the South during the war years. In both fields the South east of the Mississippi runs well ahead of the national rate of increase while the four states west of the river are only slightly below.

In the list of percentages of increase in wartime business activity, states of the South register a number of interesting "firsts." Arkansas heads the list of such increases in income payments to individuals, Tennessee in electric energy consumption, Alabama in non-agricultural employment and Maryland in business population.

Southern Construction Levels Off During 1943

(*Continued from page* 46)

$85,277,000 in the South dropped twenty-two per cent in the twelve months of 1943 as compared with the similar period of 1942. Public housing with its $209,012,000 total was also lower, although the drop was but twelve per cent from the $236,534,000 of the year before.

Eighty-five per cent of the country's public housing construction has been completed, according to national housing authorities. Most of the work, however, has been of the temporary type since summer of 1942. The total cost of the 250,000 temporary family units and the 160,000 temporary dormitory accommodations finished or scheduled under the country's war housing program is placed at about $800,000,000.

Engineering construction, other than highways, was the third major component of the 1943 total for Southern construction, the other two being in the order of value, public building and industrial construction. The engineering total for the year was $308,306,000. Eighty-six per cent of this value was for earth and airport work to provide the additional facilities needed for the country's steadily expanding air operations.

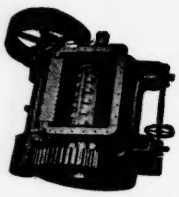
Highway and bridge construction, one of the most drastically curtailed fields of construction activity, shrunk twenty-four per cent as compared with the preceding year's activity to $128,494,000. State and local authorities have made heroic efforts to preserve their existing systems in face of conditions that have sapped their manpower and restricted their use of materials and equipment.

Deterioration of the country's highways is viewed as an acute problem. Public roads officials in December questioned the meagre provisions made by wartime regulations for maintenance and replacement of land transportation routes. Trucks and other equipment needed by the country's State highway departments are estimated to involve expenditure of $13,000,000, with repair parts adding $9,000,000 to that figure.

State Highway departments have been commended by Federal officials for efforts to keep highway transportation operating in face of what is termed "inexplicable limitations." While it is impossible to recapture the lost time and to replace worn-out vehicles, they say it is possible to do a limited amount of new construction that will avoid a material amount of new construction that will avoid a material amount of these losses.

Private construction in the South experienced a thirty-three per cent drop during 1943. The total of $89,342,000 was composed principally of private residential building, which amounted to $85,277,000 or more than ninety-five per cent of such work.

December's total for all construction was $90,264,000, of which $37,193,000 was represented by public buildings; $18,510,000 by industrial contracts; $14,981,000 by engineering construction; $14,872,000 by private building and $4,708,000 for highway work. The monthly average of Southern construction awards during 1943 was $125,345,000; that for the preceding and record year, $323,156,000.



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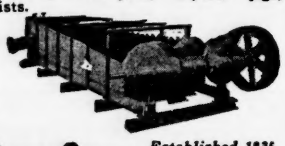

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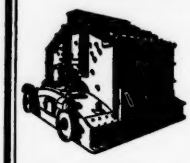

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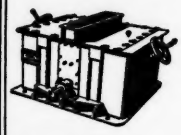

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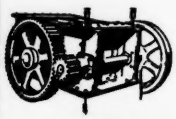

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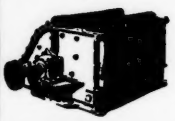

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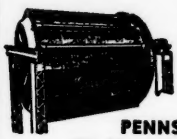

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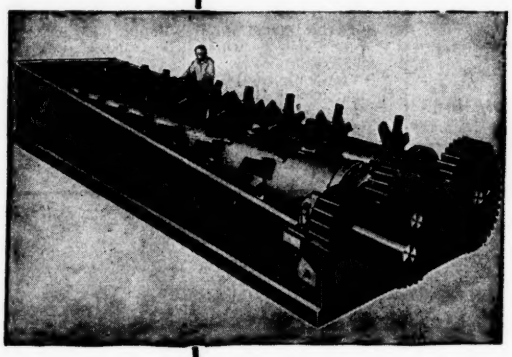

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THE WEBB CORP.
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Patriotic Letter Contest

"How We Can Keep America American," is the title of a contest for high school and college students announced by L. E. Faulkner, vice president and general manager of the Mississippi Central Railroad Company. Contributions are to be in the form of letters to the writers' senators or congressmen and will be rewarded by prizes in war bonds aggregating $400. An interesting feature is that the instructions—obtainable from Mr. Faulkner, Hattiesburg, Miss.—give a number of quotations from outstanding American leaders or state papers, and the use and identification of these statements will be factors in judging the entries.

N. & W. Remembers Soldiers

A Christmas remembrance in the form of a substantial and useful package, conveying the best wishes of the railroad family back home, was sent by the Norfolk and Western Railway to nearly 3,000 of its furloughed employees in the armed forces in this country and on the battle fronts of the world.

Each parcel contained a handsome, saddle-stitched leather writing case and stationery; a toilet kit with seven toilet articles—tooth paste, razor blades, etc.; a book of war humor illustrated by well-known cartoonists; a supply of candy and peanuts, and a genuine four-leaf clover "good luck" charm sealed in a plastic transparent case.

Southern Industrial Expansion

(*Continued from page 54*)

HOUSTON—William K. Brunet, 229 Shell Bldg., has contract at $25,000 for shop building, 1701 Lockwood Drive, for Thornhill-Craver Co.

HOUSTON—Thomas F. Miller, 524 W. 12th St., Houston, has contract for construction of addition to factory, west end of Crockett St.

TEXAS CITY—Esslinger-Misch Co., has contract for settling base building for Texas City Tin Processing Co.; Ceco Steel Products Co., 2400 Pease St., Houston, contract for rein. steel; Robert J. Cummins, Bankers' Mortgage Bldg., Houston, Engr.

WESLACO—Rio Grande Valley Citrus Exchange, R. B. McLeasish, Mgr., has under way remodeling of dehydration plant.

HARRIS COUNTY—Defense Plant Corp., Washington, D. C., granted $40,000 to Reed Roller Bit. Co., Houston, to provide equipment at plant.

TRINIDAD—Lone Star Producing Co., has under construction enlargement program at plant, Henderson County, including addition of equipment for manufacturing components used in aviation fuel and synthetic rubber; enlargement program includes installation of a thirty-six-inch by sixty-foot debutanizer column.

TARRANT COUNTY.— Defense Plant Corp., Washington, granted about $3,600,000 to American Cyanamid & Chemical Corp., New York, N. Y., to provide additional facilities at plant, in Tarrant County.

PANOLA—Arkansas Louisiana Gas Co. plans constructing and operating a 12-in. pipeline, 8.7 miles long, extending from company's plant in Panola county to southern terminus of applicant's existing line also in Panola County and a telephone line to parallel the entire proposed line.

BEAUMONT—L. N. Fisker & Co., 419 Millikin Bldg., Decatur, Ill., has contract for construction of masonry and frame office building, to accommodate workers on pipe line from Baytown, Texas, to Lambertville, N. J.; Emergency Pipelines, Inc., c/o Defense Plant Corp., owners.

GALVESTON COUNTY—Tin Processing Corp., New York, granted funds by Defense Plant Corp. to provide additional equipment for plant in Galveston County; cost $350,000.

RAYMONDVILLE — Central Power & Light Co., erect warehouse, 205 N. 6th St.; 100-ton capacity; brick and rein. conc.; R. L. Brown, local manager.

HOUSTON—McCullough Tool Co., 405 McCarty St., let contract to American Construction Co., Rusk Bldg., for $25,000 office building; two-story, brick and hollow tile, built-up roof; 20 by 80 feet; Alfred C. Finn, Bankers Mortgage Bldg., Archt.

CARTHAGE — Arkansas-Louisiana Gas Co., subsidiary of Cities Service, started construction work on an absorption type gasoline plant northeast of Carthage, Panola County, with an estimated daily capacity of 25,000,000 cu. ft. of gas; company also started work on right of way for a 16-inch pipe line from Bethany area to the plant, distance of 10 miles.

HARRIS COUNTY—Defense Plant Corp., increased its contract with Crown Central Petroleum Corp., American Bldg., Baltimore, Md., to provide additional facilities at plant in Harris County; cost $2,100,000.

HOUSTON—Earl North Buick Co., 2301 Milam St., Houston, will construct addition to factory building; owner builds; private plans.

CLODINE—Hess Warming & Ventilating Co., c/o Bryce M. Hess, Chicago, Ill., will construct storage bins for grain; owner receiving bids on sub-contracts; private plans. Similar construction at Katy, Edroy and Goose Creek.

GILMER—Sam Scales, manager of the Upshur County Rural Electrification Administration, will operate $25,000 frozen food locker plant to be erected at Gilmer.

HOUSTON — Charles P. Wagner and Brothers acquired building 1601 White St.; will remodel and occupy; wholesale bakery supplies.

VIRGINIA

LYNCHBURG—L. B. Houff, of Piedmont Brands, plans erection of 5 buildings for processing of fruits and vegetables; a plant now in operation at Bedford will be moved to Lynchburg.

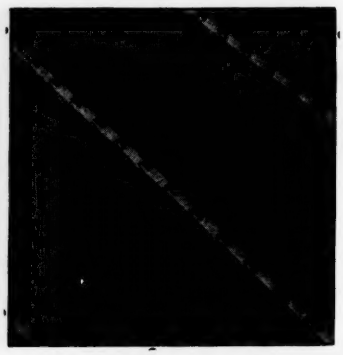
NORFOLK—Virginian Railway Co. plans building 1000 55-ton composite hopper cars in company's shops at Princeton, W. Va.

ROANOKE—Norfolk & Western Railway will build 10 new locomotives of fast freight and passenger type, Class A type.

WEST VIRGINIA

HUNTINGTON — plant — Huntington Chamber of Commerce, announced that plans have been completed for construction of a $40,000 band mill addition to the plant of the Wood-Mosaic Poplar Veneer Co. plant on the Ohio River bank at West Thirteenth St.

HUNTINGTON — A. V. Winter, local manager of the Wood-Mosaic Poplar Veneer Co., announced that arrangements have been completed for a $40,000 addition to the company's Huntington plant.



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The Agricultural South and Its Self-Sufficiency

(*Continued from page* 43)

nance farming. Self-sufficiency is not not always possible on a single farm or in a single locality, but the preponderance of evidence is that the sixteen Southern states taken as a unit could —and possibly should—set their own dinner table with a minimum of outside aid.

In a survey for the Southern States Industrial Council, Thurman Sensing poses the question of whether the South should raise not only cotton, tobacco and other specialties, but devote more effort to its own food supplies.

"The astounding and inspiring fact about the South is that it conceivably can do both. Other regions of the country can't raise many crops produced in the South, but the South *could* feed itself. The South can easily raise, and increase its production of oats and corn and wheat and barley and rye and potatoes and apples and onions. The South can easily raise more hogs. The South can produce more eggs and butter and cheese and dried fruits and dried beans and peas. The South can manufacture more flour and cereals. The South can process and pack more meats."

Industrial activity does not have to be achieved at the expense of farm production. An expanding agriculture and expanding industry could go hand in hand.

Coal: Our 1944 Demands and Production Outlook

(*Continued from page* 31)

few months it is expected that mines will be getting replacements that they so urgently need.

An opportunity for worthwhile economies by space-heating consumers is hoped for by the War Production Board, which has figured that cooperation and efficiency might offset the coal shortage by as much as 20,000,000 tons a year. Variables on the pessimistic side of the picture might be as yet unrevealed war needs or an unusually severe winter.

In the case of the individual consumer, industrial or domestic, the amount of coal on hand for the country as a whole is not necessarily a gauge of his own situation. He is dependent also on transportation. A recent survey by the Solid Fuels Administration showed that so many domestic consumers in Michigan were completely out of coal as to require 2,402 carloads to supply them with a ton apiece. Such local and sporadic cases of suffering are already present and they may spread.

Coal is the fundamental product on which most industrial products depend. It is also the source of home comfort for most of us.

Steel vs. Aluminum

The postwar steel industry will not be seriously menaced by the light metals, aluminum, and magnesium, or by plastics, Dr. John M. Weiss, New York industrial chemist, says in a report to the American Chemical Society. Nor will the very substantial percentage growth in plastic use be a marked hindrance to light metal development, he holds.

War Booms Rayon Use

United States production of rayon in 1943 totaled approximately 660,000,000 pounds, representing a 4 per cent gain over last year's output and establishing a new production record for the industry, according to William C. Appleton, president, American Viscose Corporation. Production has more than doubled in the past five years. Military uses included extra-strength tire cord and tire fabrics, parachutes for fragmentation or anti-personnel bombs, cargo and supply parachutes, uniform linings, and self-sealing gasoline tanks.

Tungsten Found in South

Economically important deposits of tungsten, a mineral urgently needed for war purposes, have recently been discovered in North Carolina and Virginia by two brothers, Joseph Hamme of Oxford, N. C., and Richard H. Hamme of Virgilina, Va. They are located in Vance county, N. C., and Mecklenburg county, Va.

Rail Boom to Continue

Railroad freight traffic in 1944 will increase between 2 and 5 per cent over 1943 and railroad passenger business will go up between 10 and 20 per cent, M. J. Gormley, executive assistant, Association of American Railroads, recently predicted in an address before the Southeast Shippers Advisory Board, meeting at Birmingham.

Do You Seek A New Industrial Site

IN POST-WAR planning, many industries are studying the possible advantages of decentralization.

Inquiry is invited as to opportunities for sites in Plaquemines Parish, Louisiana.

This area has many economic and other resources attractive to new industry, including reasonably-priced land, power, dependable rail service, petroleum, year-around temperate climate, water frontage, normally plentiful labor supply, and proximity to New Orleans and its modern port facilities. For details address—

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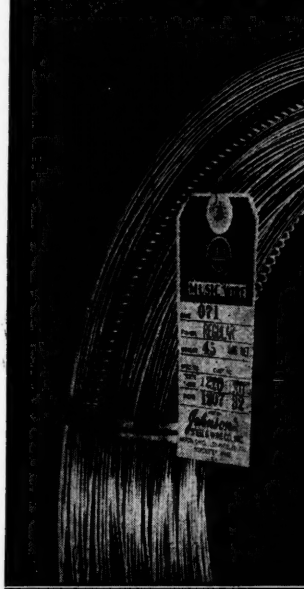

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WORCESTER 1, MASSACHUSETTS.
NEW YORK ATLANTA AKRON CHICAGO LOS ANGELES

Munitions Crates Keep Southern Mills Busy

(*Continued from page 34*)

going forward to 242 individual plants, 87 bona fide bids being received and 42 contracts awarded.

To eliminate much of the delay brought about by unfamiliarity of the manufacturers with the forms composing the bids, personal visits were made to many of the plants supplemented by long distance telephone calls, and detailed help made available by Atlanta and New Orleans Sub-Offices of the Birmingham Ordnance District.

Typical results obtained by this office working in conjunction with the W.P.B. to determine the ideal setup by which to spread this business equally among small manufacturers brought to light the manner in which numbers of inactive plants were surveyed, and the rehabilitation of many aged, infirm and handicapped men made possible by reason of this employment.

The usual procedure of placing a resident inspector in each plant manufacturing ordnance materiels could not be employed as the size of the plants would not justify it. It was decided to revert to the primitive "circuit rider" idea, assigning one inspector to several plants in neighboring territories who would go from plant to plant inspecting the crates as they accumulated.

It is interesting to note that the distribution of 42 contracts spread over the five states resulted in 9 to Alabama, 12 to Georgia, 8 to Florida, 8 to Mississippi and 5 to Louisiana. Thirty of these contracts were placed with W.P.B. invitees and 12 with Birmingham Ordnance District invitees. It will also be noted that although the number of contracts vary to the states, the amounts, as shown by the chart, are approximately the same, indicating that many of these were extremely small plants, and therefore could not handle large contracts.

Wooden ammunition crates furnish an example of the type of contracts being made available to small plants. Most of the sawmills now participating in this allocation were accustomed to making boxes, crates for furniture, etc., and were unfamiliar with the handling of better grades of lumber. They had to be instructed in the close tolerance range required and as the moisture range had to come within 12% to 18%, they likewise had to be educated in the use of a moisture meter a device new to most manufacturers in this line of work.

WOODEN AMMUNITION CRATES
TOTAL $ VALUE CONTRACTS PLACED

Contracts	*State*	*Amount*
9	Alabama	$565,200.00
12	Georgia	515,556.25
8	Florida	419,087.53
8	Mississippi	486,528.05
5	Louisiana	386,625.00
42		$2,372,096.83

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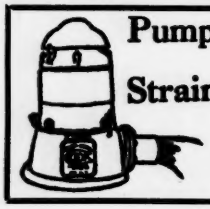
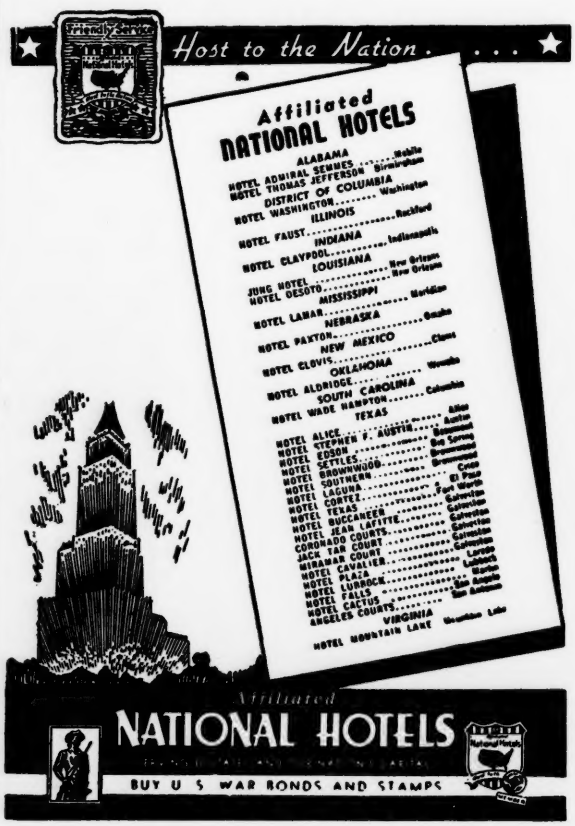
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